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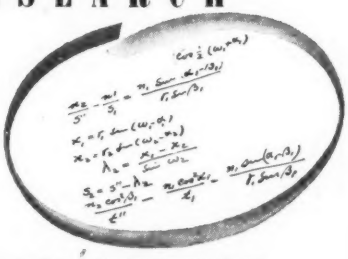

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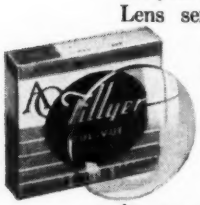

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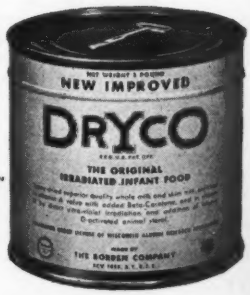

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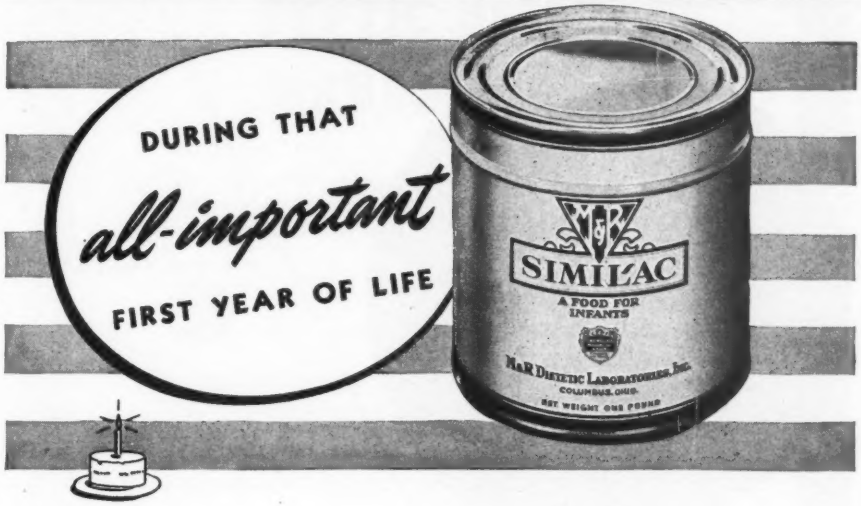

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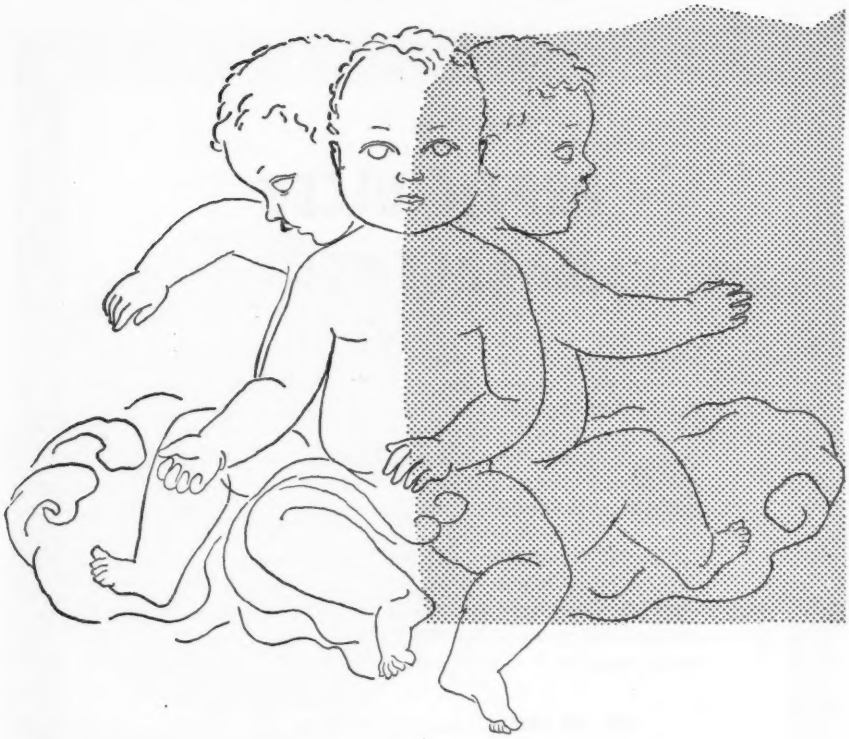

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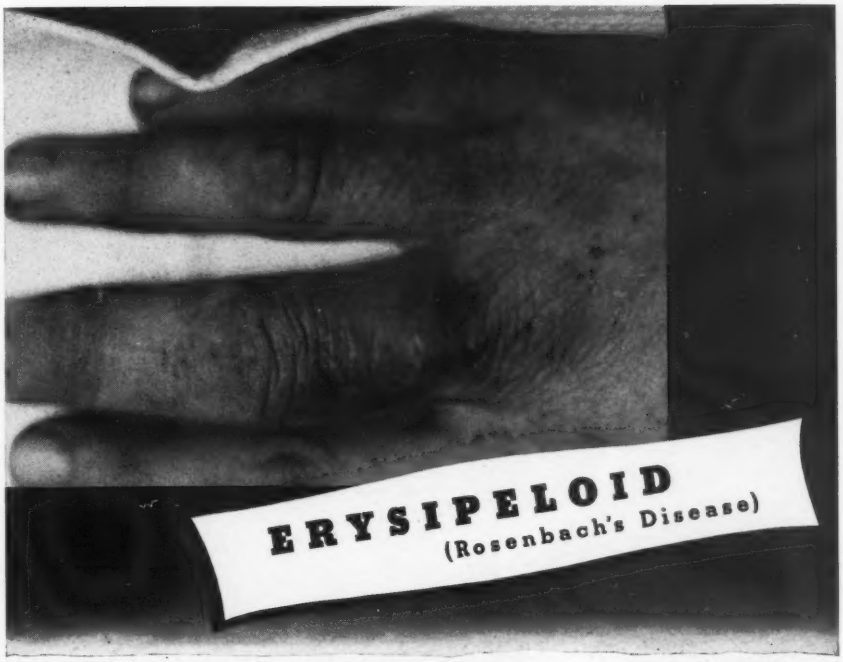

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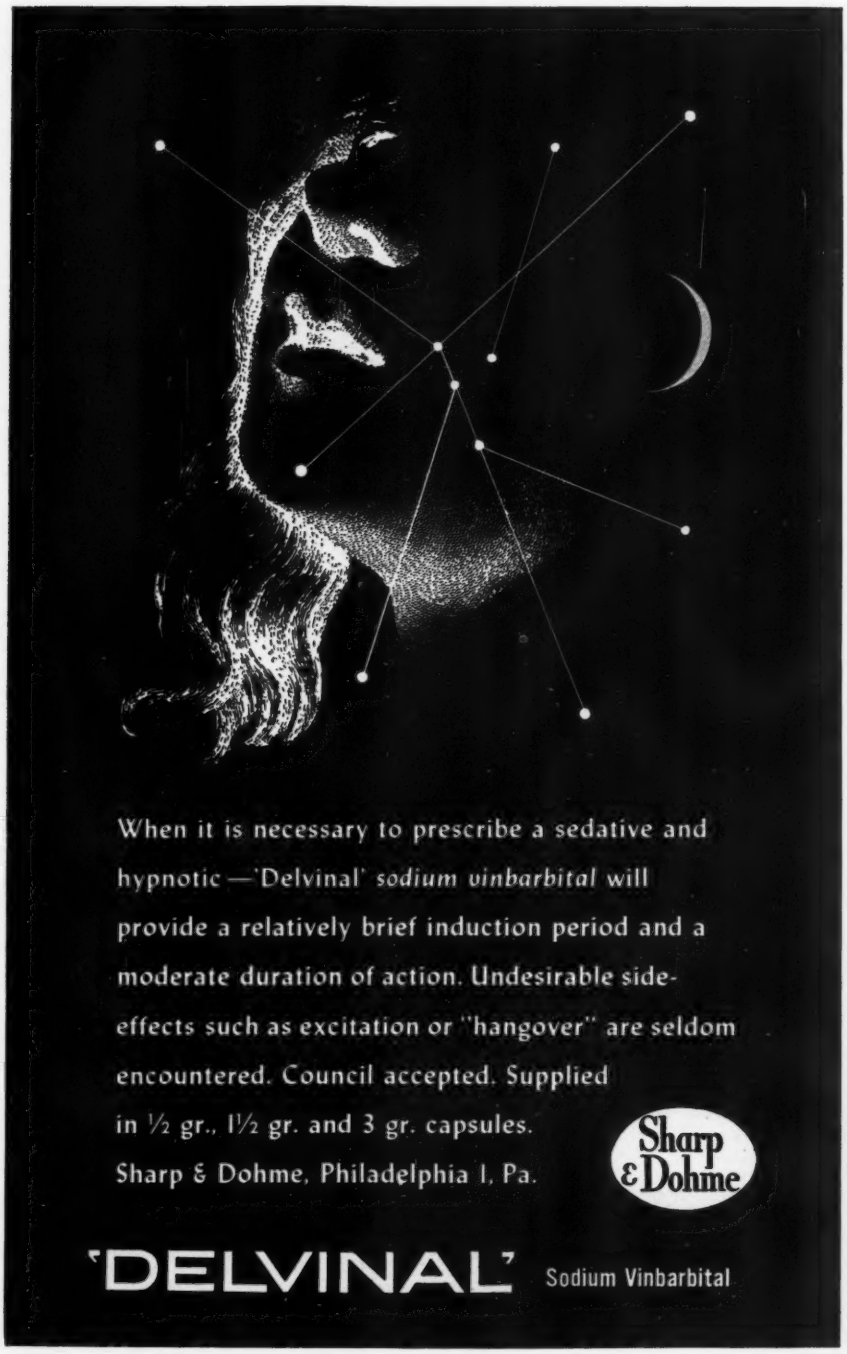
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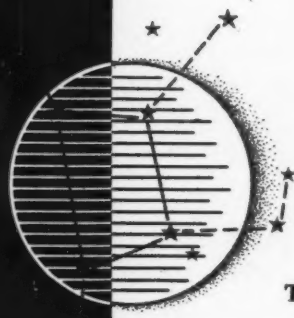

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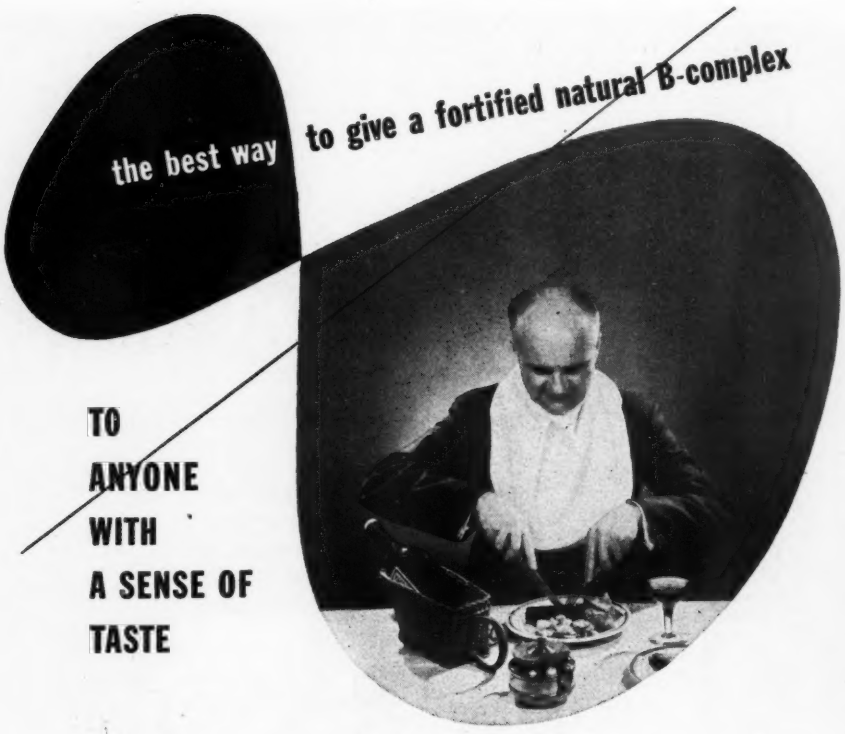

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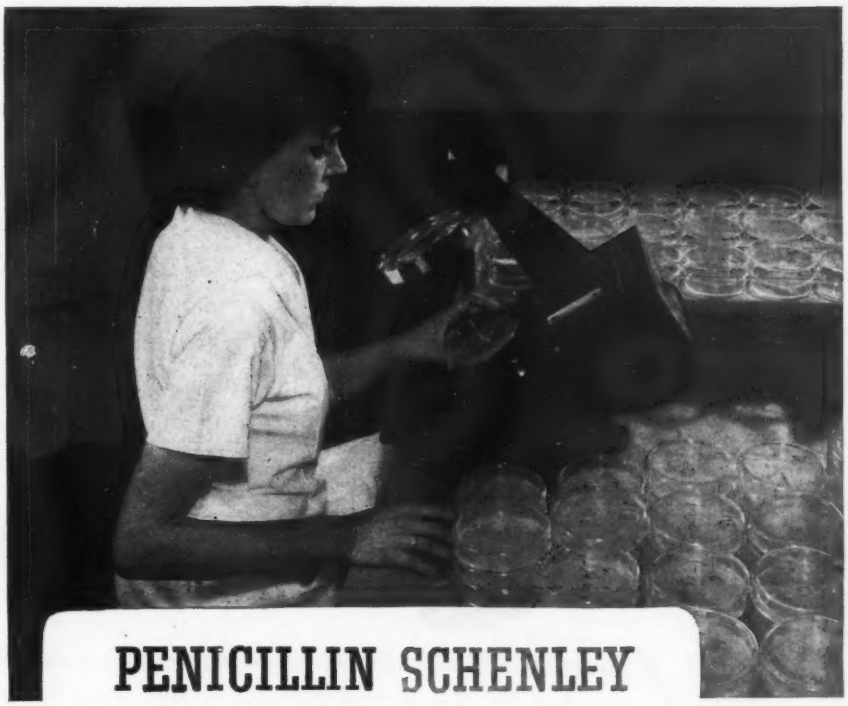

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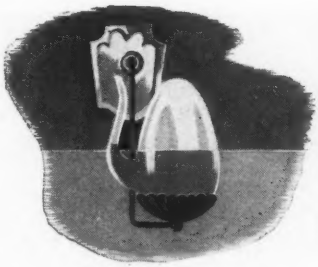


When the pressure is low—
the circulation slackens

In chronic hypotension or states of circulatory deficiency associated with convalescence, mild collapse, and other asthenic states, Sympatol provides convenient symptomatic therapy. Orally effective, Sympatol improves the peripheral circulation by raising systolic and venous pressure and increasing cardiac output. Circulation time is shortened although the pulse rate is frequently slowed.

Sympatol

To Improve Peripheral Circulation

THERAPEUTIC APPRAISAL: A synthetic pressor drug—para-methylaminoethanolphenol tartrate—for providing safe circulatory stimulation. Sympatol, on oral administration, increases venous and systolic pressures significantly, diastolic pressure only slightly, with little or no effect on the central nervous system. Repeated doses are consistently and uniformly effective.

INDICATED for symptomatic treatment of circulatory atony—to improve peripheral circulation; to increase cardiac output and shorten circulation time; to increase cardiac efficiency.

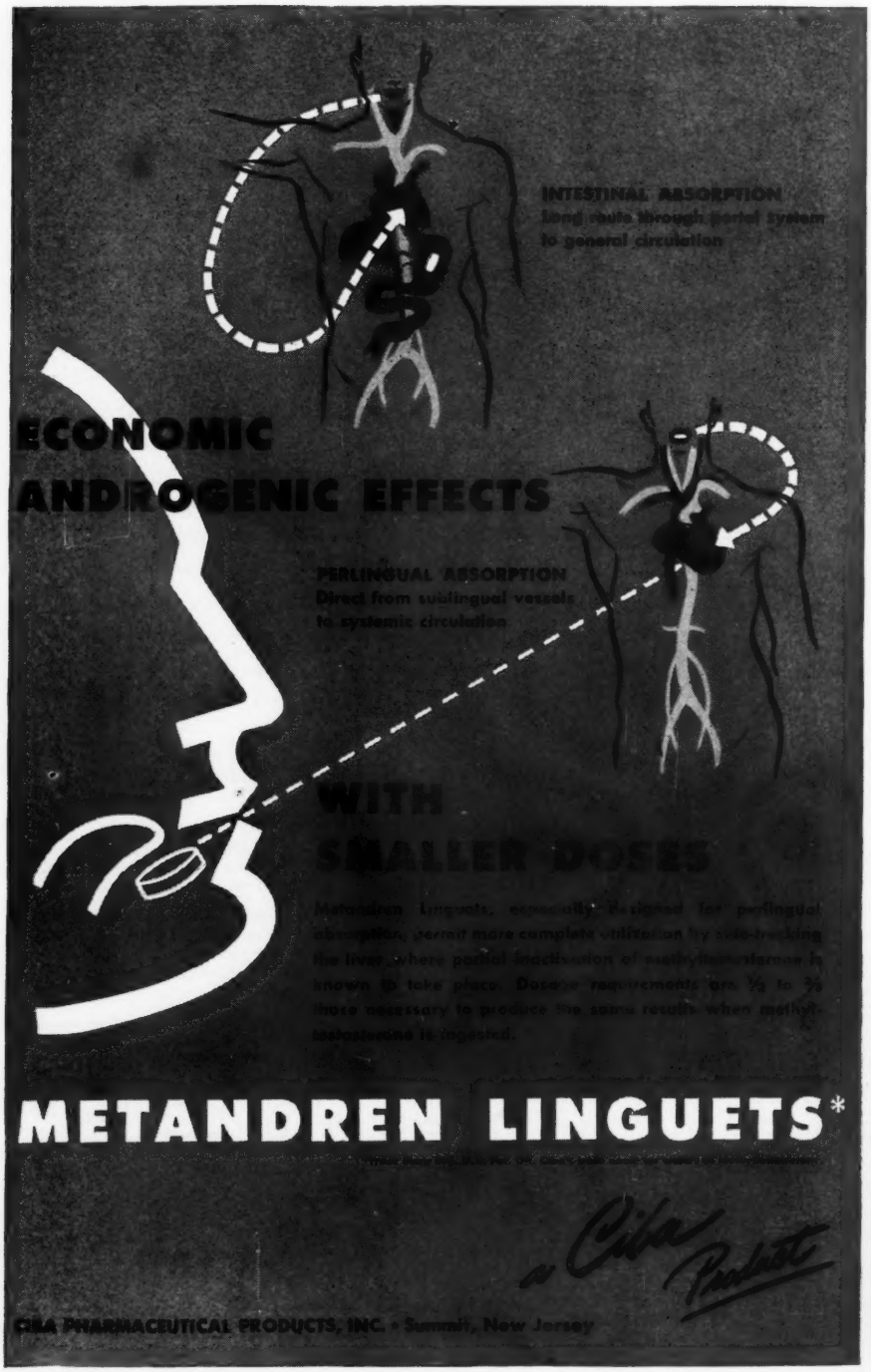
DOSAGE: Adults—1 to 3 tablets three times daily, or 1 to 2 cc. of solution every four to six hours. Children—5 to 20 minims of solution repeated as required.

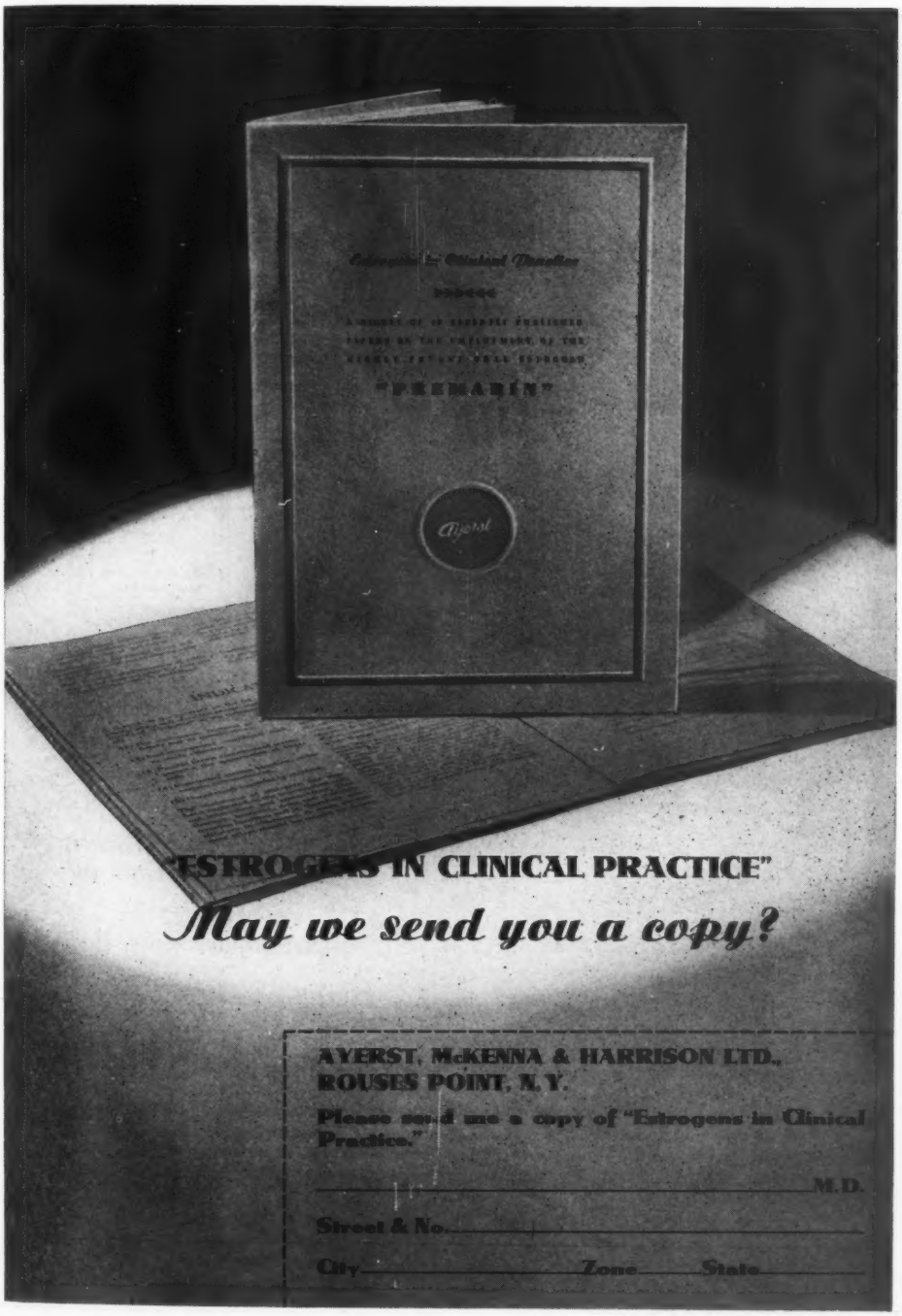
SUPPLIED in 100 mg. tablets, bottles of 50; 10% solution (100 mg. per cc.) for oral use, bottles of 30 cc.

Frederick Stearns & Company
Division
DETROIT 31, MICHIGAN

NEW YORK KANSAS CITY SAN FRANCISCO WINDSOR, ONTARIO SYDNEY, AUSTRALIA AUCKLAND, NEW ZEALAND

Trade-Mark Sympatol Reg. U. S. Pat. Off.


INTESTINAL ABSORPTION
Long route through portal system to general circulation
ECONOMIC
ANDROGENIC EFFECTS
SUBLINGUAL ABSORPTION
Direct from sublingual vessels to systemic circulation
WITH
SMALLER DOSES
METANDREN LINGUETS*
a Ciba Product
CIBA PHARMACEUTICAL PRODUCTS, INC. • Summit, New Jersey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Physicians know
from clinical experience

the reliability of

Pil. Digitalis

(Davies, Rose)

They conform now,

as in the past,

with U.S.P. requirements

Each pill is equivalent to 1 U.S.P.XII Digitalis Unit. "One United States Pharmacopoeial Digitalis Unit represents the potency of 0.1 Gm. of the U.S.P. Digitalis Reference Standard."—U.S.P.XII.

Made from Powdered Digitalis Leaf, **Pil. Digitalis** (*Davies, Rose*) present all of the therapeutic principles obtainable from the drug.

Standardized according to Pharmacopoeial requirements, they permit a uniform and accurate dosage.

These freshly prepared, standardized pills are put up in bottles of 35, forming a convenient package for the physician's prescription, obviating the necessity of rehandling.

Sample for clinical trial sent on request.

DAVIES, ROSE & COMPANY, Limited
BOSTON 18, MASSACHUSETTS, U.S.A.

D-19

when persistent depression settles upon

the

aged

patient

benzedrine sulfate

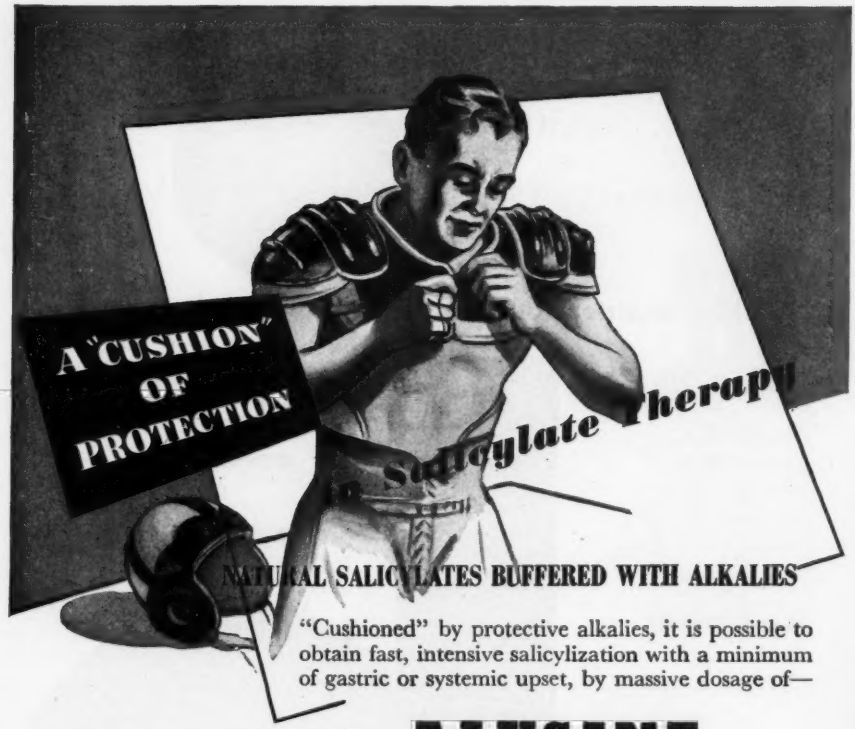
racemic amphetamine sulfate, S. K. F.

tablets and elixir

Old age sometimes brings a severe and lasting depression, marked by self-absorption, withdrawal from former interests and loss of capacity for pleasure. This characteristic depression often aggravates underlying pathology by interfering with exercise, appetite and sleep.

Because of its power to restore mental alertness and zest for living, Benzedrine Sulfate is of special value in the management of depression and anhedonia in the aged. Obviously, careful observation of the aged patient is desirable; and the physician will distinguish between the casual case of low spirits and a true and prolonged mental depression. The dosage should be adjusted to the individual case.

Smith, Kline & French Laboratories, Phila., Pa.



NATURAL SALICYLATES BUFFERED WITH ALKALIES

"Cushioned" by protective alkalies, it is possible to obtain fast, intensive salicylization with a minimum of gastric or systemic upset, by massive dosage of—

ALYSINE

Brand of Natural Salicylate and Alkaline Salts

MERRELL'S NATURAL SALICYLATES
PREPARED SOLELY FROM OIL OF SWEET BIRCH

In Alysine, Merrell's Natural Salicylate is combined in 1:2 ratio with selected alkaline salts, which act to prevent precipitation of irritant salicylic acid in the stomach, and safeguard against systemic acidotic tendency.

Alysine with the Sulfonamides

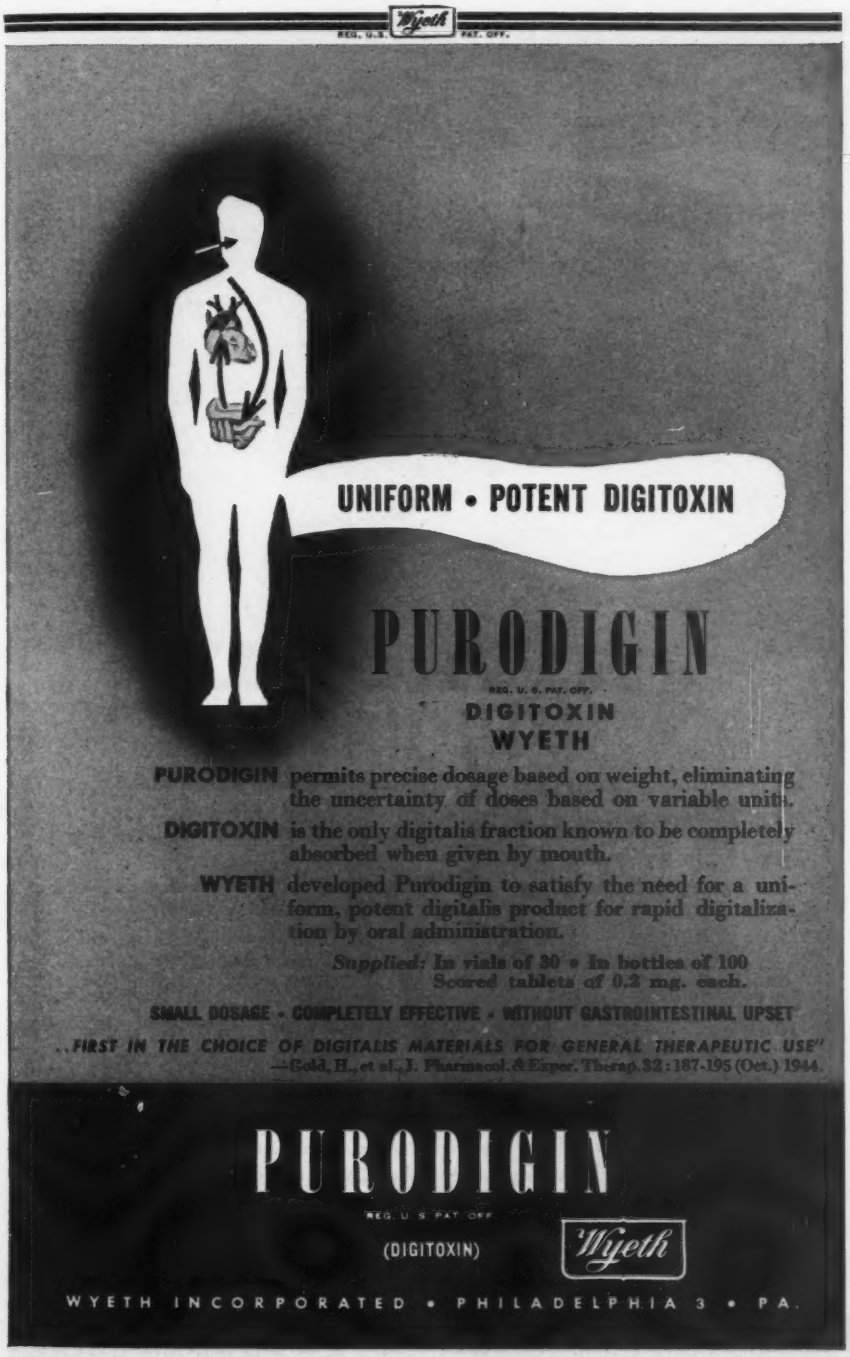
Used alone or adjunctively to the "sulfa" drugs in rheumatic fever, influenza or la grippe, Alysine provides a desirable alkaline (tolerance) factor, as well as helping to relieve the headache, muscular aches and pains which accompany most cases.

Elixir Alysine is supplied in 4-oz., pint and gallon bottles; Alysine Powder in 1-oz., 4-oz., and pound bottles.

T. M. "Alysine" Reg. U. S. Pat. Off.

MERRELL
117th Year

THE WM. S. MERRELL COMPANY · CINCINNATI, U. S. A.


Wyeth
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UNIFORM • POTENT DIGITOXIN
PURODIGIN
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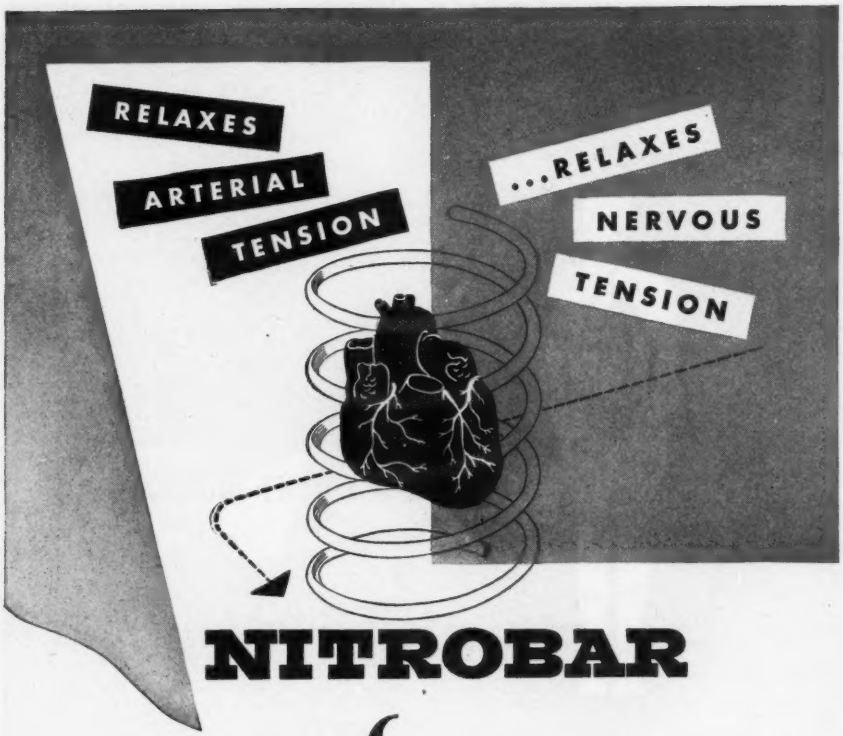
DIGITOXIN
WYETH
PURODIGIN permits precise dosage based on weight, eliminating the uncertainty of doses based on variable units.
DIGITOXIN is the only digitalis fraction known to be completely absorbed when given by mouth.
WYETH developed Purodigin to satisfy the need for a uniform, potent digitalis product for rapid digitalization by oral administration.
Supplied: In vials of 30 • In bottles of 100
Scored tablets of 0.2 mg. each.
SMALL DOSAGE - COMPLETELY EFFECTIVE - WITHOUT GASTROINTESTINAL UPSET
"FIRST IN THE CHOICE OF DIGITALIS MATERIALS FOR GENERAL THERAPEUTIC USE"
—Gold, H., et al., J. Pharmacol. & Exper. Therap. 32:187-195 (Oct.) 1944.
PURODIGIN
REG. U. S. PAT. OFF.
(DIGITOXIN)
Wyeth
WYETH INCORPORATED • PHILADELPHIA 3 • PA.



NITROBAR

IMPORTANT ACCOMPLISHMENTS in the treatment of essential hypertension:

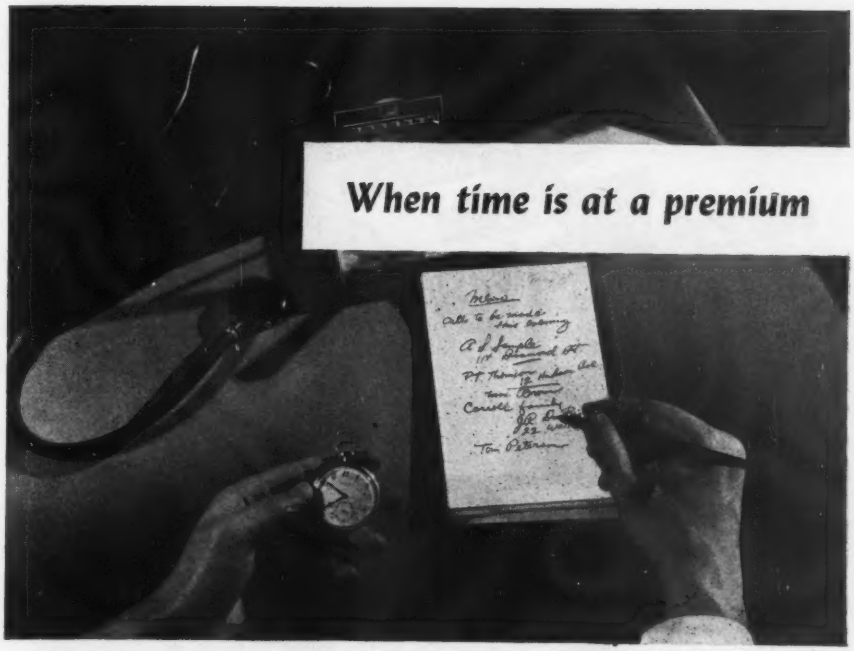
1. **gradual lowering of the blood pressure and a subsequent prolonged period of low pressure**
2. **relaxation of the patient's general nervous tension**

The bismuth subnitrate (5 gr.) in Nitrobar is reduced in the intestine and thus provides a gradual stream of nitrite ions which relax the vessel walls and bring the blood pressure down in a long curve, maintaining this low level for a matter of hours.

The addition of phenobarbital 1/8 gr. together with ext. passiflora 1/2 gr. and ext. lupulus 1/2 gr. induces the "mental relaxation" necessary to relief of hypertension. Nitrobar Comp. is supplied in engestic coated red tablets.

Bottles of 100, 500 and 1000 CAUTION: Use only as directed

McNeil Laboratories
INCORPORATED
PHILADELPHIA • PENNSYLVANIA



PYRIDIUM

(REG. U. S. PAT. OFF.)

affords several distinct advantages

EASE AND CONVENIENCE OF ADMINISTRATION

Pyridium is convenient to administer. No laboratory control, accessory medication, or other special measures are necessary for effective Pyridium therapy.

LACK OF TOXICITY

Therapeutic doses of Pyridium may be administered with complete safety throughout the course of cystitis, pyelonephritis, prostatitis, and urethritis.

RAPID RESPONSE

Prompt, *gratifying* relief of distressing urinary symptoms is the characteristic response to Pyridium therapy.

PYRIDIUM
REG. U. S. PAT. OFF.
(Phenylazo-alpha-alpha-diamino-pyridine mono-hydrochloride)
For gratifying relief of distressing symptoms in urogenital infections.

MERCK & CO., Inc. *Manufacturing Chemists* RAHWAY, N. J.

Providing the minimum adult daily requirements of all the essential B-vitamins in a single teaspoonful, Elixir 'OMNI-BETA'* assures full-range balanced replacement of every known as well as all unidentified factors present in three of the richest *natural* sources . . . liver, yeast, and rice polishings.

Highly concentrated in a *palatable* liquid medium, Elixir 'OMNI-BETA' offers exceptional efficacy enhanced by simplified administration.

a single teaspoonful contains:

- *as much* THIAMINE *as* **25 tablets brewers' yeast (7½ gr.),**
- *as much* RIBOFLAVIN *as* **100 tablets brewers' yeast (7½ gr.) and**
- *as much* NIACINAMIDE *as* **66 tablets brewers' yeast (7½ gr.);**

plus pantothenic acid, pyridoxine, and all other B-complex factors. Aqueous extract 2.594 Gm. per teaspoonful, concentrated from 13 Gm. yeast, 7 Gm. liver and 7 Gm. rice polishings.

In bottles of 4 and 8 fluidounces.

WILLIAM R. WARNER & CO., 113 WEST 18TH STREET, NEW YORK 11, N. Y.

WARNER

*Reg. U.S. Pat. Off.

ELIXIR 'omni-beta'

VITAMIN B-COMPLEX

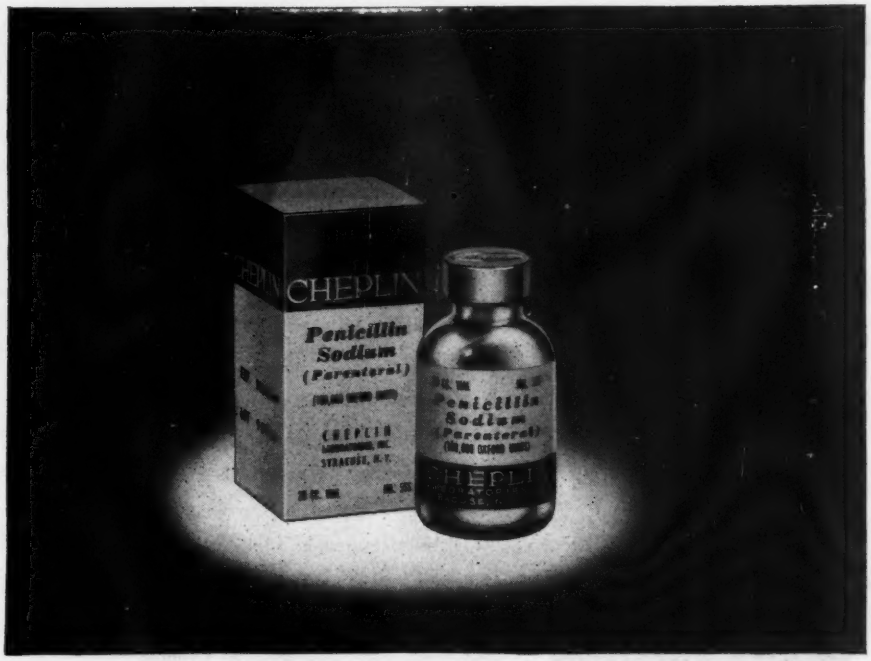
Lynoral 'Roche-Organon' has just become the preferred drug for oral estrogen therapy because it is ethinyl estradiol, a compound so potent that the dosage is measured in *hundredths* of a milligram—an amount so small that it would hardly cover the head of a pin. Such small, economical doses of Lynoral provide gratifying menopausal comfort at a surprisingly low cost. In ethinyl estradiol "a potent estrogen effect has been obtained with greater economy."* Lynoral is available in 0.05 mg tablets (scored to facilitate dosage adjustment) in bottles of 30, 60, and 250.

ROCHE-ORGANON, INC., NUTLEY 10, N. J.

*F. E. Harding, *Am. J. Obst. & Gynec.*, 48:181, 1944

Lynoral

'ROCHE-ORGANON'



POTENCY AND DEPTH OF COLOR IN PENICILLIN

Herwick, Welch, Putnam and Gamboa* offer two important conclusions regarding the possibility of irritation after intramuscular injection of penicillin. They are that:

1. An increase in potency in units per milligram of penicillin brings about a corresponding decrease in the pain produced, and
2. A correlation exists between the potency of penicillin and its light transmission.

When you employ Cheplin Penicillin in your own practice you will find it:

1. Uniformly high in potency per milligram, and
2. Markedly light in color.

Order Cheplin Penicillin through your physician's or hospital supply house.

*J.A.M.A. 127:74-76 (Jan. 13) 1945.

CHEPLIN
LABORATORIES INC. SYRACUSE 1, NEW YORK

precious months of American youth to be protected by the physician against the onset of rickets and other types of calcium deficiencies.

Conditions characterized by inadequate intake of Vitamin D, common to the critical periods of infancy, childhood and prepubescency are successfully prevented and treated with

Infron *Pediatric*

This electrically activated vaporized ergosterol (Whittier Process) is of such high potency that—

only one capsule is required each month for prophylaxis against and treatment for rickets

The clinical effectiveness and non-toxicity of *Infron Pediatric* is shown in the published work of Wolf, Rambar, Hardy and Fishbein.

Infron Pediatric is readily miscible in the infant's feeding formula, in fruit juice, milk or water. . . It can also be spread on cereal.

Infron Pediatric is now available for your prescription in the pharmacies. Each package contains six capsules—sufficient dosage for six months.

NUTRITION RESEARCH LABORATORIES • CHICAGO

Infron is the registered trademark of Nutrition Research Laboratories.

REFERENCES

Rambar, A. C., Hardy, L. M. and Fishbein, W. I.: J. Ped. 23:31-38 (July) 1943.

Wolf, I. J.: J. Ped., 22:707-718 (June) 1943.
Wolf, I. J.: J. Ped., 22:396-417 (April) 1943.
Wolf I. J.: J. Med. Soc. New Jersey, 38:436-440 (Sept.) 1941.

Printed in U. S. A.

Does

RAPID DIGITALIZATION CALL FOR THE INTRAVENOUS ROUTE?

NOTE THESE PROPERTIES

Except in the instances when the oral route cannot be employed, or when cardiac action is required in a matter of minutes, rapid digitalization no longer calls for intravenous administration. *With Digitaline Nativelle, digitalization is accomplished by mouth as rapidly as by vein.*

1—Digitaline Nativelle is the chief active glycoside of Digitalis purpurea in pure, crystalline form;

2—Is the most potent oral digitalis body available—1000 times as potent as U.S.P. XII digitalis—1 mg. of Digitaline Nativelle exerts the same cardiac action as 1 Gm. of digitalis leaf;

3—This potency is constant—the ratio between administered amount (in milligrams not "units") and cardiac action does not vary;

4—Digitaline Nativelle is totally absorbed, probably directly from the stomach;

5—Nausea and vomiting due to local irritant action are almost never encountered;

6—Dosage required for oral digitalization is exactly the same as for intravenous;

7—Digitalization is accomplished with virtually the same speed whether administration is oral or by vein;

8—The average digitalizing dose is 1.2 mg. and produces its full action in 3 to 6 hours;

9—Provided the patient has not been previously digitalized, or has not received digitalis of any kind for two weeks, the entire digitalizing dose may be given at one time; in urgent cases it should be so administered;

10—The average daily maintenance dose is 0.2 mg.; occasionally 0.1 mg. will suffice, in some instances 0.3 mg. may be required.

Priced reasonably — within the reach of every patient.

Physicians are invited to send for clinical test samples and literature

VARICK PHARMACAL COMPANY, INC.
A Division of E. Fougera & Co., Inc.
75 Varick Street, New York 13, New York

COUNCIL ACCEPTED

Digitaline Nativelle
REG. U. S. PAT. OFF.

THE ORIGINAL DIGITOXIN, IN PURE CRYSTALLINE FORM

COLOR PHOTOGRAPH BY VALENTINO SARRA

OH, BOY! JUST TWO MORE WEEKS

THINGS had looked pretty good for the North-Side Hornets until young Bill Wilkins broke his leg in the first scrimmage of the season. Bill was tough, but not so tough that his tibia didn't snap when twisted under the weight of three enthusiastic tacklers. Then followed days of hospitalization, with the inevitable cast and long hours of patient waiting. Now everything was to be all right, for only this morning Dr. Perry had said, "Just two more weeks, Bill, and you'll be as good as new." Bill knew that when Dr. Perry said "two weeks" he meant just that. All his life he had been taught to respect Dr. Perry and to rely on his judgment. It never occurred to him to question the doctor's decision.

Through the years, Eli Lilly and Company has sought to deserve for itself and for Lilly Products the confidence and respect of the physicians whom it serves. There have been no secrets from the medical profession, no duplicity, no subterfuge. The full and complete formula of every Lilly Product is always available. Quality is the first consideration in manufacturing procedures. From the selection of the crude materials to the testing of the finished product, there is no compromise. Every single Lilly Product must be worthy of the name it bears. Physicians can have the same confidence in Lilly Products that young Bill Wilkins has in Doctor Perry.

Lilly

TREATMENT OF

Menopausal Disorders

Diethylstilbestrol, Lilly, fulfills all requirements for the prompt and thorough treatment of menopausal disorders. An estrogenic response which quickly eliminates the effects of ovarian inactivity immediately follows the administration of Diethylstilbestrol. A variety of forms and dosage sizes is available through your regular source of medical supplies.

ELI LILLY AND COMPANY • INDIANAPOLIS 6, INDIANA, U.S.A.

Nutritional adequacy is a fundamental requisite for normal convalescence. LIVER AND YEAST EXTRACT *ARMOUR* is an excellent nutritional adjuvant, not only because of the nutritional factors it contains, but also because of its tonic effect and stimulating action on the appetite. It hastens convalescence and helps overcome lassitude, fatigue and malaise. Furunculosis and inflammatory or ulcerative lesions of the mucous membrane may yield also to Liver and Yeast therapy.

LIVER AND YEAST EXTRACT *ARMOUR* is absorbed rapidly and its physiologic stimulating effect is noted promptly. In this preparation, the yeast has been washed free from gastrointestinal irritating properties. The hydrolyzing and stabilizing processes are so conducted that the often objectionable liver odor and taste are eliminated while the primary and secondary anti-anemic factors as well as the vitamin B complex of both liver and yeast are preserved. It is quite palatable.

LIVER AND YEAST EXTRACT *ARMOUR* is supplied in 8 ounce bottles. The adult dose is two teaspoonfuls twice daily. Larger doses, if indicated, may be given safely. It is best administered in a little milk, water, or fruit juice. When there is a decided tendency toward secondary anemia it may be given in conjunction with some form of iron.

℞ Liver and Yeast Extract Armour

Have confidence in the preparation you prescribe – specify ARMOUR.

The ARMOUR Laboratories
CHICAGO 9, ILLINOIS
Headquarters for Medicinals of Animal Origin

"*Hope* need not be dispelled in those women who, in the usual course of events, could not have the experience of motherhood . . . the judicious use of progesterone assures to some unborn children the certainty of a life that would not otherwise be theirs."[1]

PROLUTON

administered promptly when spontaneous abortion threatens or is habitual, helps carry the fetus to term in women whose corpus luteum deficiency imperils the development of a healthy, normal pregnancy.

PROLUTON (progesterone) is available in ampules of 1 cc. containing 1, 2, 5 and 10 mg.; boxes of 3, 6 and 50 ampules.

TRADE-MARK PROLUTON—REG. U. S. PAT. OFF.

[1]REYNOLDS, S. R. M.: PHYSIOLOGY OF THE UTERUS, NEW YORK, PAUL B. HOEBER, INC., 1939, P. 350.

Schering CORPORATION • BLOOMFIELD • N.J.

HEADACHE OF RENAL ORIGIN

Headache "is probably the most dramatic complication of renal disease." Associated with hypertension, it is "frequently intense, sharply localized with definite onset and culmination, and strongly suggestive of localized cortical vascular spasm."*

*McDonald, R. H.: (Headaches of renal origin): M. Clin. N. Am. 24:363 (March), 1940.

'TABLOID'
Empirin COMPOUND

In bottles of 100 and 500 • *Acetophenetidin gr. 2½ • Caffeine gr. ½ • Acetylsalicylic Acid gr. 3½ • Also 'Tabloid' 'Empirin' Compound with Codeine Phosphate gr. ⅛, gr. ¼ and gr. ½ • 'Tabloid' and 'Empirin' are Registered Trademarks*

BURROUGHS WELLCOME & CO. (U.S.A.) INC., 9 & 11 EAST 41ST STREET, NEW YORK 17

Wyeth
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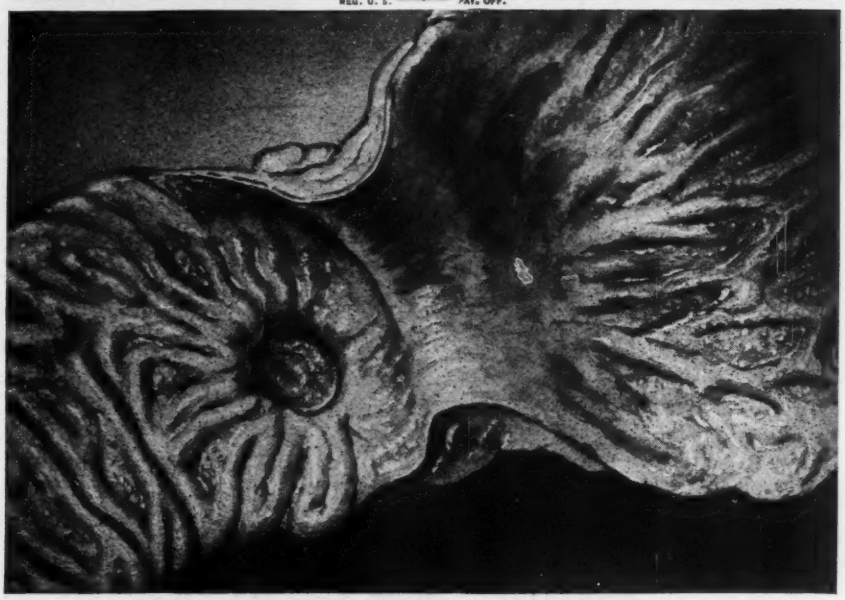
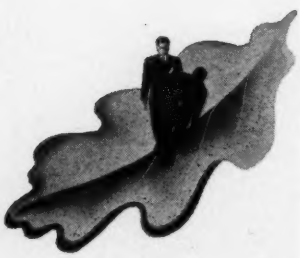


PROTECTION

against peptic ulcer recurrence



In view of the tendency of peptic ulcer to recur in the spring and autumn, many clinicians return their patients to *full ulcer therapy*—diet, rest, antacids—from the middle of September through October and from the beginning of March through the middle of April. • Amphojel provides safe, dependable antacid medication admirably suited to offset episodes of hyperacidity. It inactivates gastric secretions without alkalinization, mildly and efficiently. Supplied in 12-fluidounce bottles.

AMPHOJEL

REG. U. S. PAT. OFF.

Alumina Gel

Wyeth

WYETH INCORPORATED • PHILADELPHIA 3 • PA.

FROM THE
PHYSICIAN'S
POINT OF VIEW...

These distinctive attributes suggest

MANDELAMINE

Reg. U. S. Pat. Off.
(Methenamine Mandelate)

- Lack of Toxicity
- Convenience of Therapy
- Prompt, Effective Action
- Wide Range of Therapeutic Activity

Mandelamine is supplied in enteric coated tablets of 0.25 Gm. (3¾ grains) each, in packages of 120 tablets sanitaped, and in bottles of 500 and 1000.

NEPERA CHEMICAL CO. INC.
21 Gray Oaks Ave.
Yonkers 2, New York
Please send me literature, and a physician's sample of Mandelamine.

Name.....M.D.
Street.....
City.....State.....

NEPERA CHEMICAL CO. INC.

Manufacturing Chemists Yonkers 2, New York

Over and Over...

During the hay fever season—when the days of distress drag on and on—the consistent effectiveness of Neo-Synephrine assures prompt relief time after time. The last application before frost decongests as surely as the first.

Neo-Synephrine

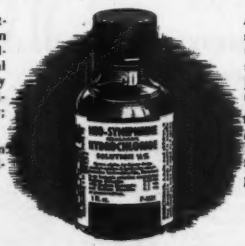
HYDROCHLORIDE

L-ARTERENOL · L-HYDROXY-β-METHYLAMINO-4-HYDROXY-ETHYLBENZENE HYDROCHLORIDE

For Nasal Decongestion

THERAPEUTIC APPRAISAL: Quick-acting, long lasting . nasal decongestion without compensatory recongestion; relatively free from cardiac and central nervous system stimulation; consistently effective upon repeated use; no appreciable interference with ciliary activity; isotonic to avoid irritation.

INDICATED for symptomatic relief in common cold, sinusitis, and nasal manifestations of allergy.



ADMINISTRATION may be by dropper, spray or tampon, using the ¼% solution in most cases and the 1% when a stronger solution is indicated. The ½% jelly in tubes is convenient for patients to carry.

SUPPLIED as ¼% and 1% in isotonic salt solution. and ¼% in isotonic solution of three chlorides, bottles of 1 fl. oz.; ½% jelly in collapsible tubes with applicator.

Frederick Stearns & Company

Division

DETROIT 81, MICHIGAN

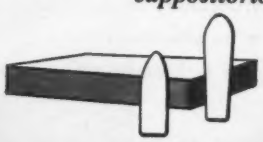
NEW YORK KANSAS CITY SAN FRANCISCO WINDSOR, ONTARIO SYDNEY, AUSTRALIA AUCKLAND, NEW ZEALAND

Trade-Mark Neo-Synephrine Reg. U. S. Pat. Off.

Introducing

AMINET

suppositories



for the prompt and prolonged relief of bronchial asthma, cardiac asthma and Cheyne-Stokes respiration. Aminet provides a practical means of administration of aminophylline and sodium pentobarbital for most effective therapy and sedation.

More effective than oral dosages, Aminet Suppositories avoid gastrointestinal irritation and discomfort. Sensitivity reactions frequently encountered parenterally may be eliminated as a contraindication to aminophylline therapy when Aminet Suppositories are prescribed.

Aminet suppositories in boxes of 6 and 12; adult dose — 0.5 Gm. (7.5 gr.) and infant dose — 0.25 Gm. (3.75 gr.) with appropriate dosages of sodium pentobarbital.

For detailed literature address

Bischoff

ERNST BISCHOFF COMPANY, INC. • IVORYTON, CONNECTICUT

vasoconstriction in minutes act

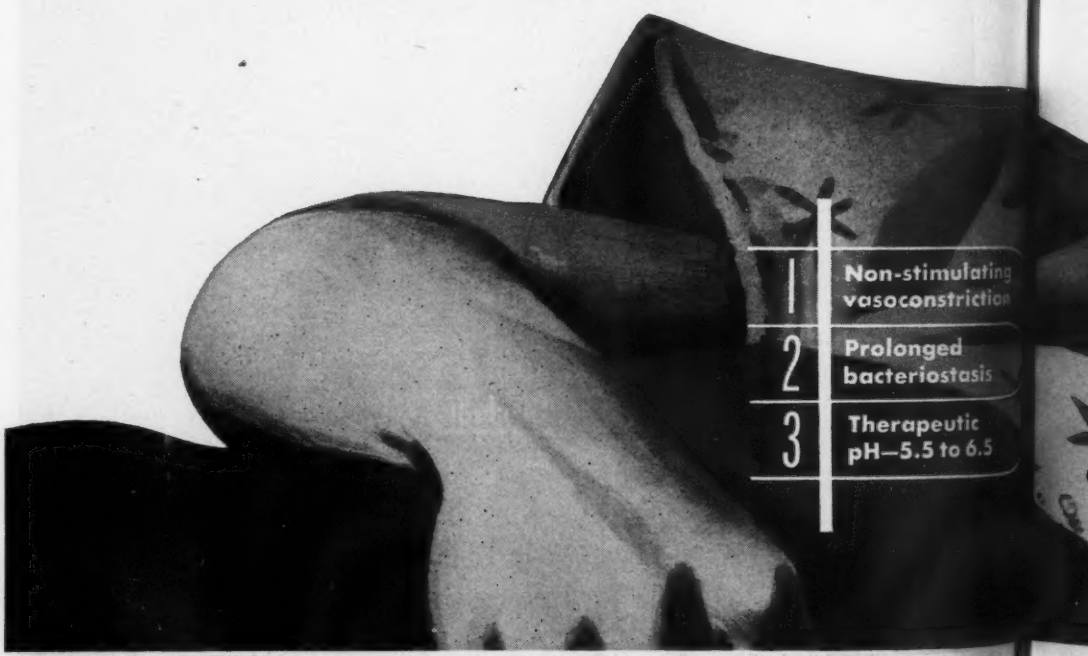
In the treatment of nasal and sinus infections, Paredrine-Sulfathiazole Suspension . . .

1. Affords more rapid, complete and prolonged shrinkage than that produced by ephedrine in equal concentration. Ventilation and drainage are promptly promoted and infected areas are quickly rendered accessible to the sulfathiazole.

2. Provides prolonged bacteriostasis. Paredrine-Sulfathiazole Suspension covers the nasal mucosa with a fine, even frosting of free sulfathiazole, which does not quickly wash away, *but keeps producing bacteriostatic* actio *hour after hour.* (An objection to solutions of sodium sulfathiazole is the improbability of their remaining in contact with the mucosa long enough to be effective.)

Smith, Kline & French Laboratories—Philadelphia, Pa.

PAREDRINE—SULFATHIAZOL US



acteriostasis for hours
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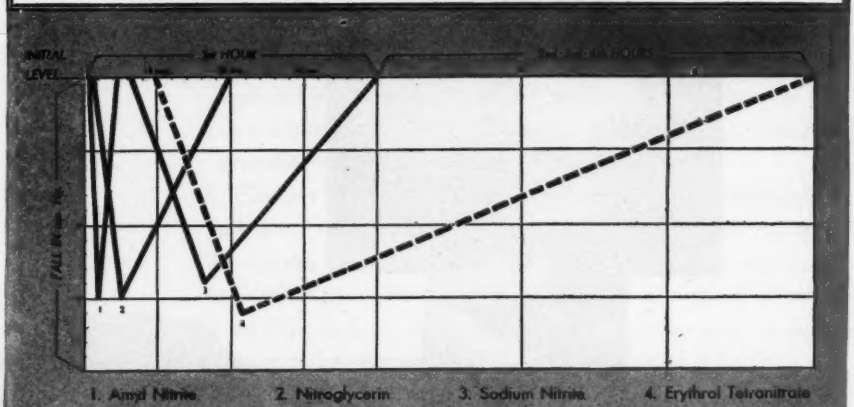

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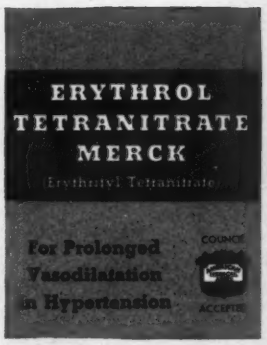

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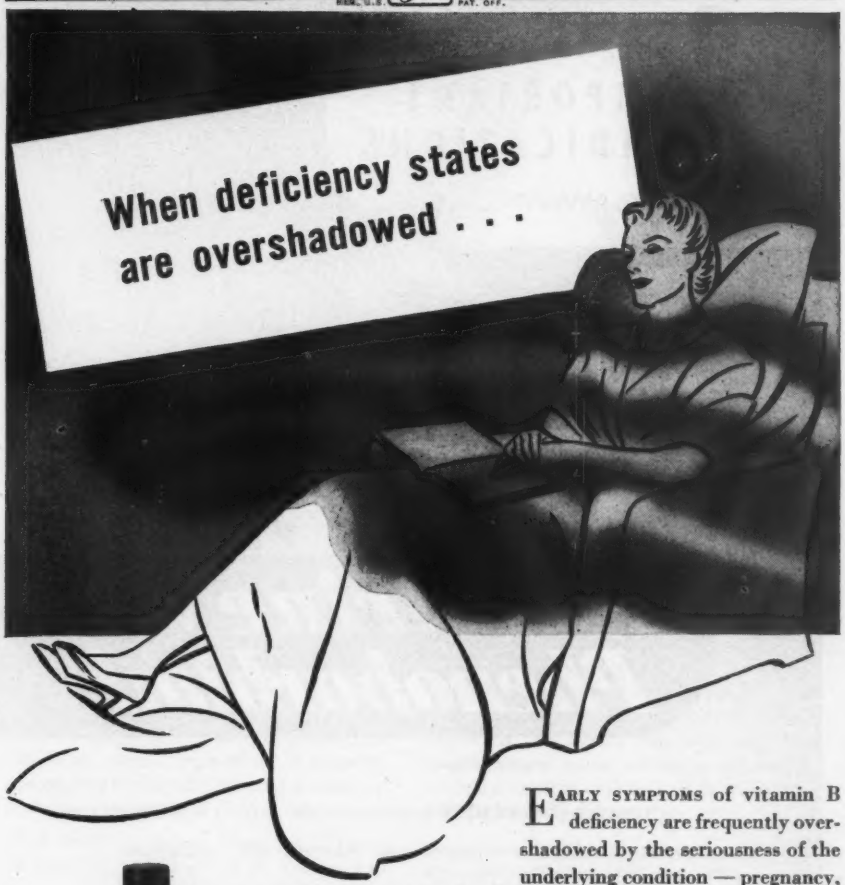

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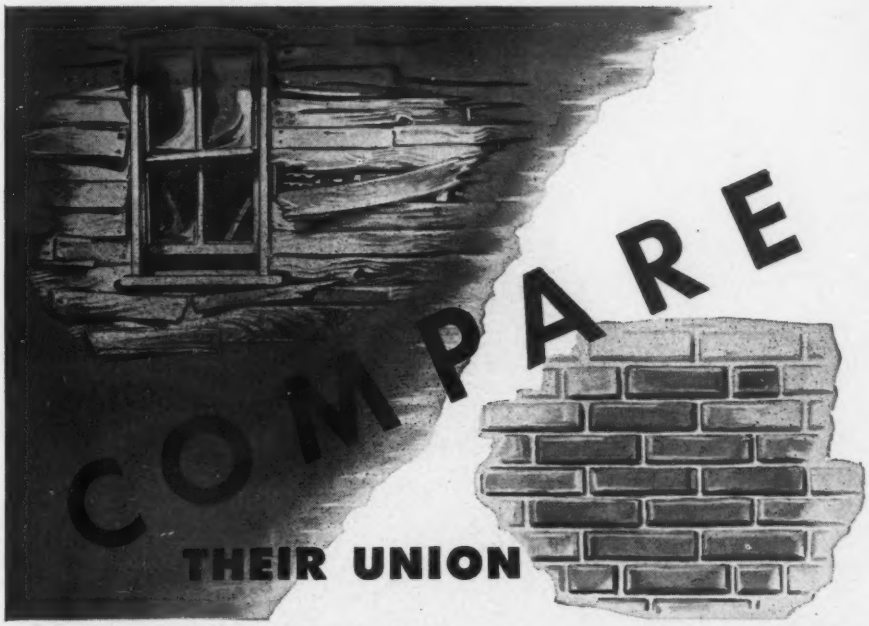

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*Soskin, Samuel: The Role of Carbohydrate in the Diet, Modern Medicine 12:84 (Nov.) 1944.

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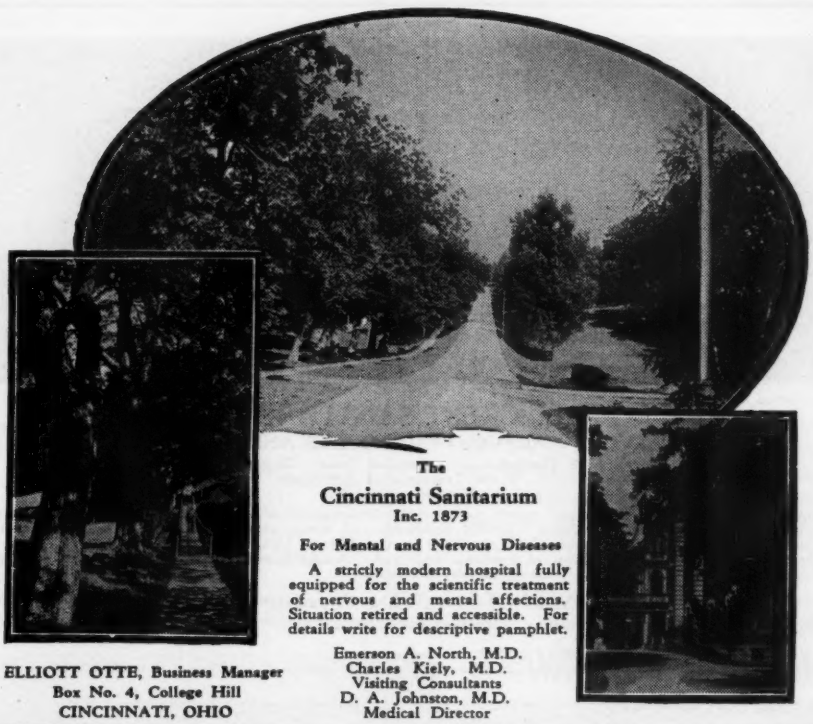

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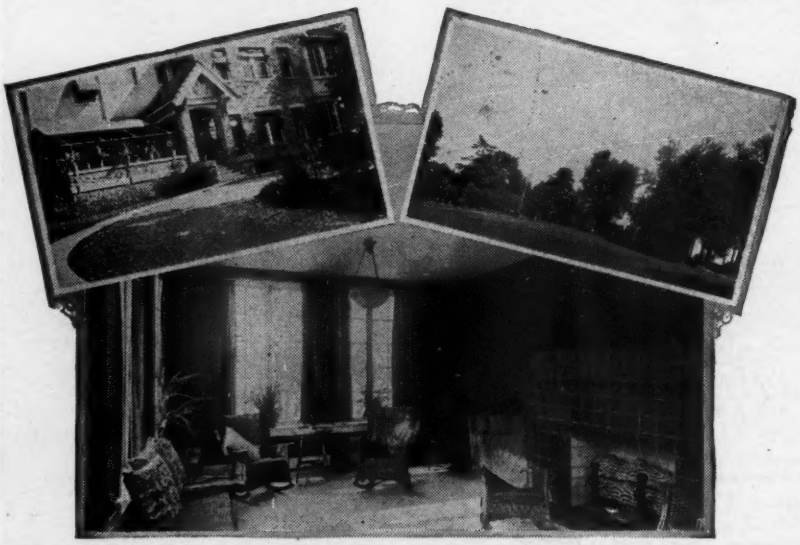

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Volume 38 SEPTEMBER 1945 Number 9

RECTAL ULCERS WITH PERIRECTAL FISTULA AS A PORT OF ENTRANCE FOR TORULA ENCEPHALITIS*

By V. K. ALLEN, M.D., F.A.C.S.
and
LEO LOWBEER, M.D.
Tulsa, Oklahoma

As early as 1861 it was known that yeasts could be the cause of disease in man. In that year Zenker reported a case quoted by Freeman in 1931. The first case of Cryptococcus (Torula) infection was described by Busse in 1895, but he classified the responsible fungus as a Saccharomyces or Blastomyces. Stoddard and Cutler in 1916 were the first to differentiate coccidioidomycosis, American blastomycosis and European blastomycosis and they introduced the name "torulosis" for the latter variety, calling the fungus Torula histolytica. At the present time the fungus is being classified as Cryptococcus hominis following the nomenclature of Vuillemin in 1901. It belongs to the group of fungi imperfecti. Infection with the fungus is still considered relatively rare, but cases have appeared in the literature with sufficient frequency to make us conscious of the pathogenicity of this organism. Although the infection has occurred in several different locations in the body, the Cryptococcus hominis seems to have a predilection for the lungs and the central nervous system, especially the latter.

The diagnosis of this condition is usually difficult to make before autopsy. This is because the disease has a very insidious onset and the manifestations are protean in character. If it is located in the central nervous system, it is often confused with tuberculous meningitis, epidemic encephalitis, syphilis and tumor or abscess of the brain.

McGehee[4] in 1926 reported a case of pelvic abscess in a Negro woman, from which Torula histolytica was isolated; the patient recovered. He covered the literature very thoroughly and concluded that Torula infection can be subdivided into two types: (a) the systemic type which is usually without fever or leukocytosis and nearly always ends fatally; (b) the local type which is attended with fever, leukocytosis and recovery. He was also of the opinion that different strains of Torula account for the difference in the clinical picture in man and the experimental picture in animals.

In 1924, Hansman reported a typical case of Torula disease with central nervous system involvement, and a careful search of the literature shows a number of such cases. The port of entry has been a matter of some concern. Some authors feel that their studies would indicate that it was through the respiratory system that the fungus entered the body. The tonsils or throat have also been suggested as a port of entrance, while yet others believe that the gastro-intestinal tract is the most logical place of entrance. Oscar Felsenfeld,[1] has made a careful investigation of enteric mycology of a large number of patients in the Mantina and Chicago State Hospitals, and others. He investigated the "normal" flora of the intestinal tract of these patients, as well as the pathogenic organisms. He extended his cases to 300 new admissions, 600 ward cases, 100 typhoid carriers, 103 food upset cases, 47 bacillary dysenteries, and 51 treated dysentery cases. He found yeast-like fungi in a large num-

*Read in the Section on Proctology, Southern Medical Association, Thirty-Eighth Annual Meeting, St. Louis, Missouri, November 13-16, 1944.

*From the Proctological Department and the Pathological Laboratories, Hillcrest Memorial Hospital, Tulsa, Oklahoma.

ber of these individuals and classified them as Monilia, Cryptococcus and Geotrichum. This study as well as others have proven that the Torula histolytica may be found in the intestinal tract in a large number of persons. If this be true, then we may naturally arrive at the conclusion that lesions of the intestinal tract may be the portal of entrance of the Cryptococcus hominis (or Torula histolytica) to the tissues of the body. It is with this thought in mind that we present the following case which has come under our observation, to prove that perirectal fistulae, especially of the magnitude and chronicity of the case in question may be the indirect cause of the Cryptococcus (Torula) encephalitis which occurred.

CASE REPORT

Mrs. B. D., age 34, a white female, was admitted to Hillcrest Memorial Hospital on August 18, 1941. Examination showed a marked stricture of the rectum at the upper third. There was associated with this stricture a large fistula which connected posteriorly with a chronic abscess and a large mass of fibrous tissue lying in the hollow of the sacrum. The fistula also formed a recto-vaginal opening as well as an opening in the left perianal area, anteriorly. Vaginal examination also disclosed a mass in the lower abdomen, which was diagnosed as a low grade chronic pelvic abscess. The patient was having symptoms of a chronic intestinal obstruction which was thought to be due as much to the stricture of the rectum, as to chronic adhesions of the lower abdomen. Ten years previously she had had some antisyphilitic treatment although she was doubtful of the diagnosis. She had been operated upon for hemorrhoids in 1933 and again in 1940 which was followed shortly by the appearance of the recto-vaginal and the perianal fistula. Ten to 14 days before admission she had had a great deal of discomfort in the lower abdomen, with increasing number and frequency of spells of nausea, vomiting and bloating with distention. There was increasing evidence of the need of surgical intervention, although, because of an aortic insufficiency, she was definitely a poor surgical risk. After two blood transfusions and other therapy directed toward improving her condition she was taken to surgery. On August 29, 1941, a colostomy and drainage of the pelvic abscess was done. Her condition was entirely satisfactory for a few days; she then developed a paralytic ileus which required an ileostomy. This was done on September 4, 1941. The general condition of the patient improved gradually, and the ileostomy was finally closed. She was dismissed from the hospital on September 22, 1941, for continued convalescence at home. On January 11, 1942,

Fig. 1

(A) Anterior wall of anus, rectum, sigmoid with supra-anal and recto-sigmoid stricture; also perirectal abscess, containing two probes, one leading into rectum at lower stricture, the other probe ending in perianal fistula.

(B) Posterior wall of vagina and uterus, with probe in vagina just below cervix leading into perirectal abscess; other probe lies in fistulous duct between abscess and colostomy opening. Stenosis of left ureter and hydronephrosis.

she was again admitted to the Hillcrest Memorial Hospital with persistent headache of two weeks duration, especially severe the six days before admittance.

She very often screamed with pain and was not relieved with morphine. These symptoms were accompanied by evidence of cardiac and circulatory embarassment. Her colostomy was functioning satisfactorily.

Physical examination revealed a very ill, poorly nourished woman. Her eye grounds were negative, although the eyes had a dull droopy appearance. The pain was most severe in the top of her head. The muscles in the back of the neck were tense and very tender but no opisthotonus was present. Marked carotid pulsations were noted, with a bounding shot-like action of the pulse. Blood pressure was 150 systolic, 20 to 0 diastolic. The remainder of the examination was as previously described. Blood count: red cells 4,500,000; hemoglobin 14 grams; white cells 21,450 with 82 per cent neutrophils. Blood Wassermann was negative. The urine showed two plus albumin and a moderate amount of pus. The spinal fluid showed 350 cells per cu. mm., predominantly lymphocytes; positive Pandy; mid-zone curve of colloidal gold test, and a negative Wassermann. Culture of the spinal fluid showed extensive growth of a fungus which unfortunately was considered a contamination by the technician and was discarded by him without reporting to the pathologist.

X-ray of the chest was negative for tuberculosis, which aided in ruling out this as a cause of the meningeal irritation. The severe pain in the head continued, as well as the grogginess, semi-delirium and restlessness. The circulatory embarassment increased and there was evidence of marked intracranial pressure although no choking of the disks was evident.

Dr. N. R. Smith, neurologist, who was consulted, was of the opinion that the patient had a toxic or possibly virus form of encephalitis, but gave consideration to the presence of an abscess, tumor or gumma of the brain also. She developed projectile vomiting and her speech mechanism became inadequate. She was in continuous distress as indicated by extreme restlessness and constant moaning. Her respiration became difficult, the pulse slow and thready. These symptoms became worse until death occurred on February 22, 1942, approximately two months after onset of the cerebral symptoms.

An excerpt of the *necropsy* findings follows:

The entire rectum shows chronic ulcerative proctitis with portions of the mucosa preserved, the rest converted into granulation or scar tissue. Two strictures were found, one above the anus, the other at the rectosigmoid junction, the latter almost completely obstructive. The supra-anal stricture contained a fistulous opening leading into a huge perirectal abscess surrounded by a thick mass of fibrotic scar tissue. This abscess also opened into three other fistulae, one leading into the perianal tissue, the second into the vagina, and the third into the colostomy. The left ureter was embedded in the perirectal scar tissue with ensuing dilatation of the ureter lumen above and of the left kidney pelvis (*Fig. 1, A and B*).

The ascending aorta shows moderate dilatation, some wrinkling and scarring of the intima above the aortic valves, and there was marked widening of the commissures of the semilunar aortic valves causing an insufficiency of these valves. The left heart ventricle was hypertrophic and dilated (*Fig. 2, A*). The lungs show two fresh abscesses surrounded by pneumonic infiltration in the left lower lobe and there was purulent exudate in the left pleural cavity.

The brain shows milky thickening and arachnoid adhesions of the leptomeninges as well as ependymal adhesions within the lateral ventricles. The basal arteries seemed unchanged. Multiple small brownish-yellowish foci were found in the basal ganglia and internal capsule of the left hemisphere (*Fig. 2, B*).

Microscopic Examination.—The mucosa of the rectum is converted into granulation tissue composed of lymphocytes, plasma cells and fibroblasts. No giant cells were found nor any evidence of fungi. The perirectal abscess

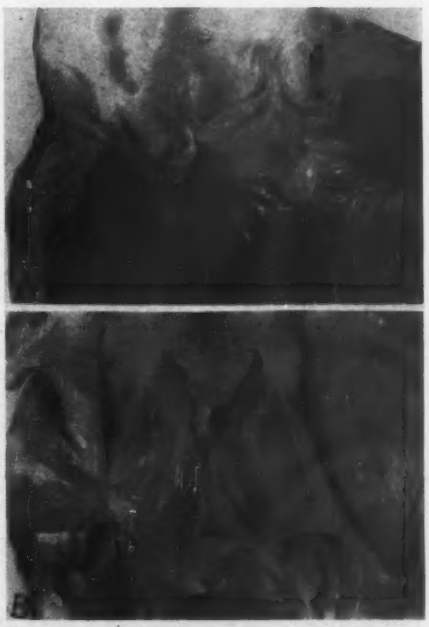

Fig. 2

(A) Syphilitic aortitis with widening of the commissures of the semilunar valves. Note small endocardial pocket underneath widened commissure between left and posterior valve which is result of regurgitation of blood.

(B) Coronal section through basal ganglia of brain with greyish foci in left caudate and lenticulate nucleus, internal capsule and thalamus.

and the fistulae were all lined by granulation tissue of the same type. The aorta shows the media and adventitia infiltrated with multiple fibrous scars and occasional round cell infiltrates and gives the picture of an arrested aortitis of the syphilitic type.

The lung abscesses show no specifity. No fungi could be found. The brownish foci found grossly in the basal ganglia of the brain contained numerous necrotic and granulomatous areas. The necrotic areas (*Fig. 3, A and B*) contained numerous round yeast-like organisms, each surrounded by a clear, apparently mucinous halo, and some showed budding. There was no endo-sporulation.

The granulomatous areas (*Fig. 4, A, B, and C*) consisted of lymphocytes, plasma cells, numerous giant cells of the Langhans or foreign body type, macrophages, fibroblasts and occasional round, double-contoured organisms also, some within giant cells. The leptomeninges were densily infiltrated with granulomatous cells of the same kind and the perivascular lymph spaces within the brain were also filled with a variety of round cells, occasionally containing a yeast-like organism.

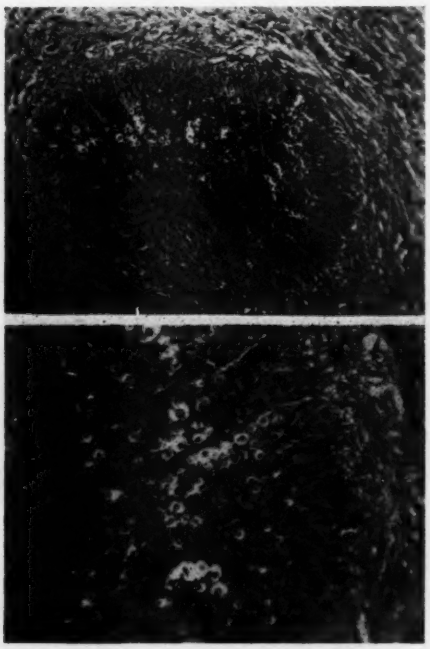

Fig. 3

(A) Microphotograph, low power, of brain, showing large necrotic area containing many yeast-like spherules.

(B) Microphotograph of same region under high power, showing yeast-like spherules surrounded by clear halos, some with peripheral budding; all lying in necrotic and necrobiotic round cellular granuloma.

COMMENT

The rounded, yeast-like organisms found within the necrotic foci of the brain and elsewhere in the cerebral and meningeal granulomas

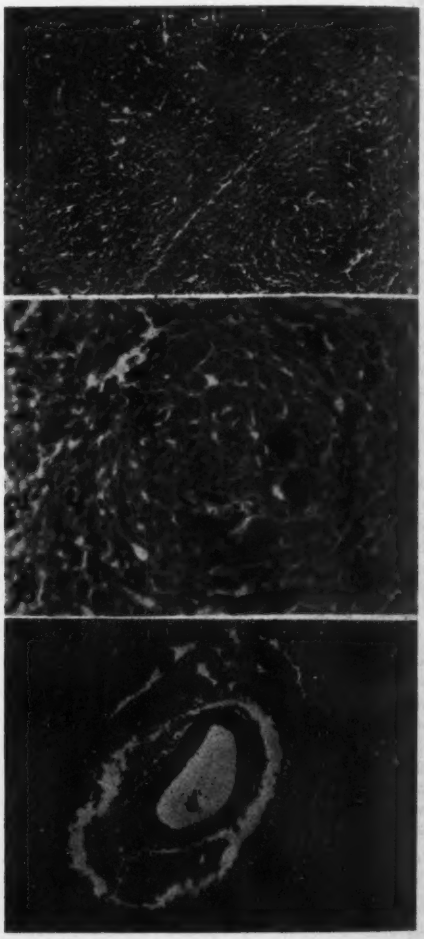

Fig. 4

(A) Microphotograph, low power, of brain, showing areas of granulomatous nodules and diffuse granulation tissue.

(B) Microphotograph of same granulomas, high power, showing numerous giant cells, round cells, histiocytes and shadows of yeast cells.

(C) Microphotograph of brain, showing perivascular lymph space and pia infiltrated by round cellular granuloma with occasional giant cells.

were held to belong to the Cryptococcus hominis (Torula histolytica) variety of fungi imperfecti. This diagnosis was based on their appearance (large, clear, mucinous capsule), their budding, and their location in brain and meninges. No culture was possible as no fungus infection had been suspected previously. There was massive fungus invasion of the brain with extensive necrosis and little tissue reaction as well as minor fungus invasion with extensive granulomatous tissue reaction and fungus destruction.

The aorta showed evidence of a syphilitic aortitis, arrested with much fibrosis, presumably as a consequence of the patient's antiluetic treatment, but there was typical syphilitic insufficiency of the aortic valves.

The rectal ulcers, strictures and perirectal abscess and fistulae showed no evidence whatever of fungus infection. In view of the proved venereal syphilitic infection of the patient it is reasonable to assume that this ulcerative fibrotic proctitis was also the consequence of a venereal infection, that is, lymphopathia venerea, gonorrhea or even syphilis. Unfortunately no Frei test was ever undertaken. Although certainly not caused by fungi, these rectal and perirectal granulations were held to have served as an entrance into the blood stream of the Cryptococcus fungi which are frequent inhabitants of the gastro-intestinal tract. From the blood their location within brain and meninges took place. An excerpt from the final pathological diagnosis reads:

(1) Chronic ulcerative proctitis with supra-anal and recto-sigmoidal stricture.

(2) Walled-off chronic perirectal abscess with recto-vaginal, recto-anal, and recto-sigmoid fistulae, stenosis of left ureter and hydronephrosis.

(3) Cryptococcus (Torula) encephalitis and meningitis.

(4) Syphilitic aortitis with insufficiency of the aortic valves.

(5) Terminal bronchopneumonia with abscess formation and empyema of the left pleura.

SUMMARY

(1) The literature has been reviewed with reference to infections caused by Cryptococcus hominis (Torula histolytica). Especial note is made of meningeal and cerebral involvement.

(2) Further evidence is presented to show that careful research demonstrates the presence of this as well as other fungi in the normal gastro-intestinal tract.

(3) Case report showing Torula infection of the brain and meninges in a patient who had a very large chronic perirectal abscess and fistulae arising from a chronic ulcerative proctitis with strictures. Since there was seemingly no other port of entry for the fungus to enter the body tissues, and since the modern concept is that the infection reaches the brain and meninges through the blood stream, this was interpreted as indicating that the fungus entered the body by way of the perirectal fistulae and abscess or of the rectal ulcers.

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DISCUSSION (*Abstract*)

Dr. F. H. Murray, Philadelphia, Pa.—This is the first time I have heard of this yeast-like organism entering the human body through a rectal infection.

It is difficult to discuss this paper without repeating some of Dr. Allen's observations.

It is thought that the portal of entry is usually through the upper respiratory passages and lungs and that Torula has a special affinity for the tissues of the central nervous system. Invasion of this system by Torula has been universally fatal. This disease occurs rather infrequently.

The condition is often overlooked or wrongly diagnosed as syphilis, tuberculosis, cerebral neoplasm, encephalitis or abscess.

Diagnosis is usually made at autopsy, but may be made by smears and culture of the spinal fluid.

Dr. Allen (closing).—The paper was presented, not so much for a discussion in proctology but to show that we should be on the alert to connect pathology in the rectum with other diseases which may arise in patients under our observation.

A MODIFIED MANCHESTER TECHNIC FOR PARTIAL PROLAPSE OF THE UTERUS*

By LEE F. TURLINGTON, M.D.
Birmingham, Alabama

Since the best known gynecologists over the world have written exhaustively on the subject of vaginal plastic operations, it is with considerable humility that I approach the subject.

Every gynecologist has his own operation for each condition resulting from relaxation of the pelvic supports. That operation is, most often, a modification of some classical procedure that is well known and it accomplishes, in the hands of the individual, what he thinks is the best result. The principles have already been established by masters of the art, but frequent discussions of various modifications and possible refinements of technic may suggest further modification that will approach a possible ideal. I frequently see a new technic that I like and at the same time see a slight change in it that suits me even better. The purpose of this paper is to present those modifications of well known surgical procedures which have been successful in my hands.

In the medical school days of 1910 to 1914, probably the most difficult anatomic structures for me to understand were those that constitute the pelvic supports. It was John G. Clark, with his plastic moulding materials, who first gave me a clear understanding of these structures. He frequently quoted his preceptor, Howard A. Kelly, and was generous in his praise of the work of George Gray Ward and William P. Graves. The late Floyd Keene, than whom there was never a more finished operator, working as understudy with Clark, furnished some of the ideas utilized by his chief in his vaginal plastic surgery.

I feel sure that the number of prolapses of the uterus, cystoceles, and so on, seen by me in the last two years, is a greater proportion of my work than has formerly been the case.

These conditions that require vaginal plastic operations are urethrocele cystocele, clefts of the cervix, or chronic inflammation resulting from lacerations, prolapse of the uterus, vaginal enterocele, rectocele, vesico-vaginal and recto-vaginal fistulae. Since all of these conditions, with the exception of fistulae, are encountered in prolapse of the uterus, the technic for the care of this problem will be described. In none of my cases have I encountered third degree, or complete prolapse of the uterus in young women. In practically all cases of complete prolapse that have come under my observation, the uterus has been atrophic, and quite often the cervix has been found badly diseased. Enterocele has not been recognized in the first and second degrees of prolapse of the uterus. The cases of complete prolapse have been treated by vaginal hysterectomy. When I do encounter a third degree prolapse in a young women, I shall certainly conserve the uterus. Practically all cases of first and second degree prolapse of the uterus have been treated with what I have designated as a

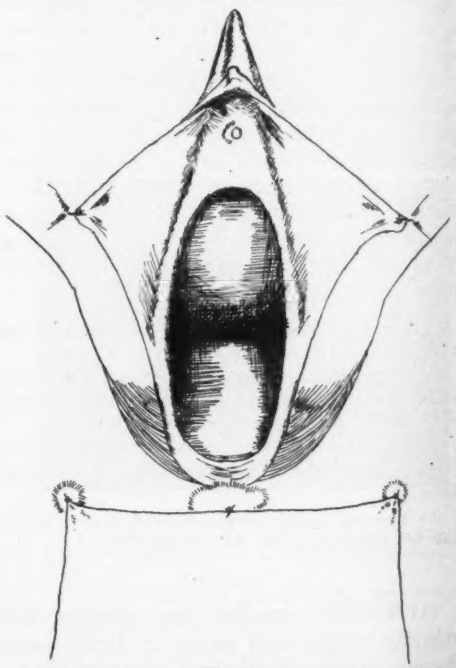

Fig. 1

Labia minora retracted with sutures. Rubber dam, to protect field from anal region, is sutured to perineum and to buttocks on each side. Relaxed vaginal outlet with cystocele and rectocele.

*Read in Section on Gynecology, Southern Medical Association, Thirty-Eighth Annual Meeting, St. Louis, Missouri, November 13-16, 1944.

modification of the Manchester vaginal plastic operation. The technic is more nearly that described by John G. Clark, since the only similarity to the Manchester technic is the approximation of the cardinal ligaments in front of the amputated cervix.

Local infiltration of procaine hydrochloride for anesthesia is preferred, both because of the safety for the patient and because of the added ease with which the dissection can be made after submucous infiltration. If for any reason general anesthesia is insisted upon by the patient, normal salt solution is used to infiltrate the submucous tissues just ahead of the dissection.

Epinephrine, 1/1000 solution, three drops to the ounce of 1 per cent procaine, until nine drops of ephinephrine are used, helps tremendously in hemostasis. In the event that the patient has arterial hypertension, epinephrine is omitted. Preoperative sedation is ordered according to the patient's requirements.

(*Fig. 1*) Three wheals are made with procaine hydrochloride solution, one on each buttock, and one in the perineal skin. Through these are passed sutures, fixing a rubber dam sheet for protection of the operative field from the anal region. Procaine solution is injected into the perineal and pararectal tissues to relieve the patient of the discomfort that would otherwise be caused by the weighted speculum. The cervix is held lightly with an Allis clamp, to facilitate injection of a few drops of procaine solution into the undiseased part of its anterior lip (*Fig. 2*). This area is now grasped with a tenaculum, and the uterus is pulled down enough to tense the anterior vaginal wall. Procaine solution is injected into the tissues, all around the cervix, fairly deeply into the bases of the broad ligaments and into the area of the attachment of the bladder to the cervix. Procaine solution is

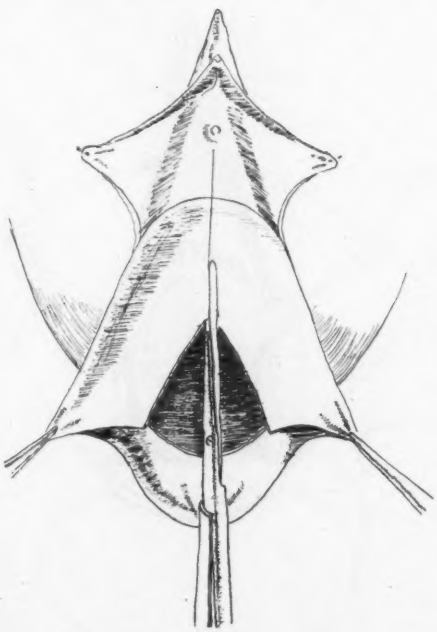

Fig. 2

Cervix pulled forcibly down. Procaine hydrochloride solution has been injected subcutaneously over the cystocele and into each broad ligament. Clamps are attached to vaginal wall lateral to cervix on each side. The vaginal mucosa is reflected over the triangle marked by the external meatus of the urethra, and clamps lateral to the cervix on each side.

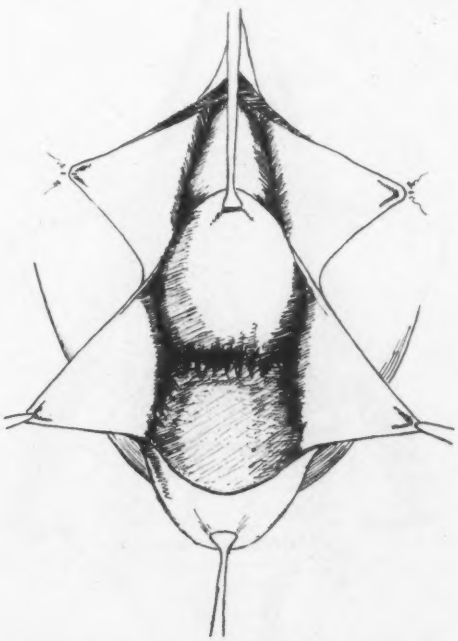

Fig. 3

The bladder has been detached from the cervix. Allis clamp, attached to musculo-fibrous tissue, retracts bladder. The vaginal mucosa has been dissected from the vaginal wall covering the cystocele, and is reflected laterally.

now injected into the submucous tissues over the cystocele, up to the external urethral meatus. Allis clamps are applied to the vaginal mucosa at points lateral to the cervix on each side, which, when brought together, will shorten the cardinal ligaments to the desired extent. A curved incision is made through the mucosa from one clamp to the other, going anterior to the cervix. A longitudinal incision is now made from the midpoint of this incision, going up to a point just below the external urethral meatus. The vaginal mucosa is carefully dissected from the musculo-fibrous tissue, from the midline on each side and reflected over a triangular area marked by the Allis clamps and a point just below the external urethral meatus. The lateral limits should be such that they will meet in the midline comfortably without undue tension. Dissection through this plane gives a minimum of bleeding.

(*Fig. 3*) The bladder is now separated from the cervix and the lower part of the fundus uteri, starting in the midline, the tissue being pushed toward each side. This will demonstrate a considerable amount of musculo-fibrous tissue attached to the cervix that should be clamped, cut and ligated, since it will have in it some troublesome bleeders. This maneuver allows the ureters to be pushed well above the point of danger.

(*Fig. 4*) The vaginal mucosa is incised around the cervix, going from each side to a point one-half to one inch behind the cervix in the midline. The cervix is amputated, the amount of cervix removed depending upon its length and the extent of disease found. In women of child-bearing age the diseased tissue only is cored out. If a high amputation is deemed necessary in women of child bearing age, the fundus uteri is pulled down anteriorly through an opening into the peritoneal cavity, and the cornual portion

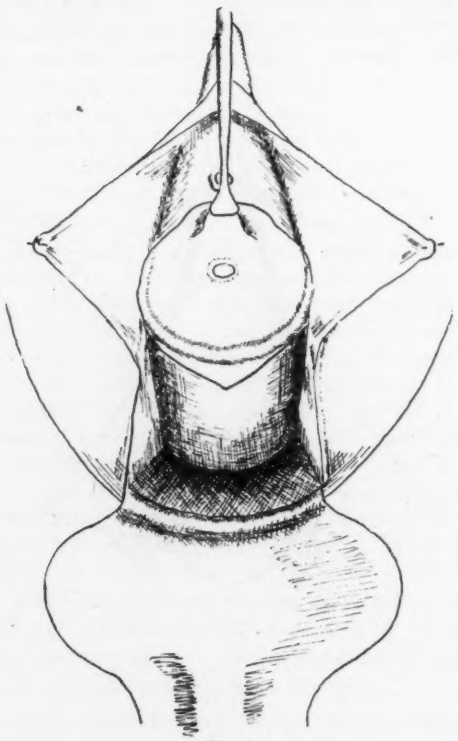

Fig. 4

The cervix is pulled anteriorly. Incision is made through the vaginal mucosa from a clamp on each side of cervix, to a point ¾ to 1 inch posterior to the edge of cervix in midline.

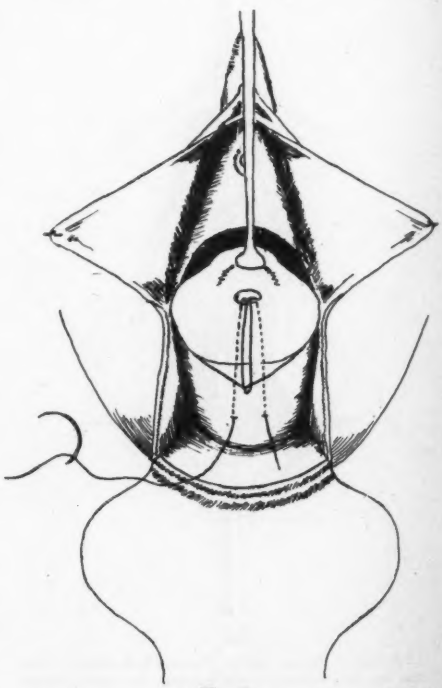

Fig. 5

The cervix has been amputated. Sturmdorf suture has been placed, which will pull the vaginal mucosa from the point of the denuded triangle to the external os of the cervix.

of each fallopian tube is resected for sterilization. At this stage after the diseased tissue has been removed, the cervical canal is well dilated, and the interior wall of the fundus curetted.

(*Fig. 5*) A Sturmdorf suture is applied in the posterior midline, which brings the posterior vaginal mucosa to the new external cervical os (*Fig. 6*). Sutures, through and through, are applied laterally in sufficient number to control the bleeding and to cover the cut end of the cervix with vaginal mucosa (*Fig. 6*). Two deep sutures of No. 1, 20-day chromic catgut are now applied, the first going through the mucosa and cardinal ligaments on the right, then to take a small bite in the anterior surface of the cervix, and next through the cardinal ligament and the vaginal mucosa on the left. The second suture is applied just above and in the same manner. These sutures are not tied until the cystocele has been cared for.

(*Fig. 6*) At this time a No. 00, 20-day chromic catgut suture is passed from right to left through the musculo-fibrous tissue in the line on which it has been cut from its attachment to the cervix, a bite being taken at its mid-point into the anterior surface of the uterus at the point to which the bladder is to be lifted. The suture is not to be tied until the cystocele has been inverted. The mucosa that has been lifted from the cystocele is pulled across the midline and pared away, having just the flap that will meet the opposite one in the midline without undue tension.

(*Fig. 7*) Starting just below the external urethral meatus, pulley sutures of No. 00, 20-day catgut are applied as follows: through the

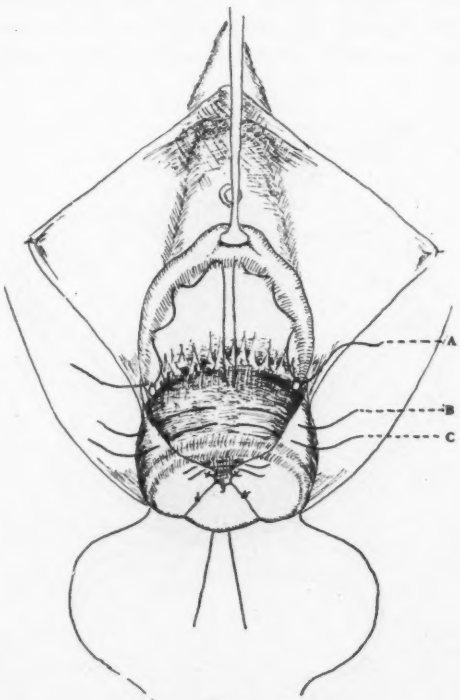

Fig. 6

Sturmdorf suture has been tightened. Interrupted sutures have been applied to cover the cervix with mucosa. Sutures B and C have been applied through the vaginal mucosa and cardinal ligaments on each side of cervix, taking a bite in anterior surface cervix. Suture A is applied through the tissue which formerly attached bladder to cervix, which, when tied, will advance the bladder well up on the anterior surface of the uterus.

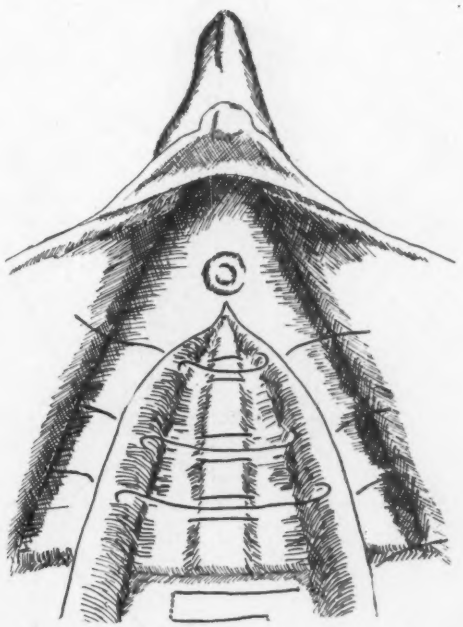

Fig. 7

Pulley sutures have been applied, going through the vaginal mucosa and the underlying musculo-fibrous tissue on the right, through the deep tissue to the left of the urethra, back to pass through the deep tissue on the right, and then to pick up the deep tissue and the vaginal mucosa on the left.

mucosa and the thick musculo-fibrous tissue just beneath, on the right, across to the left and through the musculo-fibrous tissue, back to the right, through the musculo-fibrous tissue and back to pick up this tissue on the left and the mucosa. Three or four of these sutures are applied to include the supporting tissues under the entire length of the urethra before any are tied. As these sutures are tied they approximate the layer of supporting musculo-fibrous tissue, and at the same time the vaginal mucosa. Since it binds the mucosa to the underlying tissue, it precludes the possibility of dead space where serum or blood might accumulate, and fixes the urethra snugly under the symphysis (*Fig. 8*). After these surtures are tied, a half strand of No. 00, 20-day chromic catgut in a small, round, curved needle is applied as follows: through the vaginal mucosa on the right, just below the last of the above described sutures, to pick up the musculo-fibrous tissue to the left of the midline, and to be continued as a running Lembert suture over the cystocele to the line of detachment of the pelvic fascia from the cervix. This suture should invert about two-thirds of the cystocele (*Fig. 9*). The direction of the line of suture is now reversed and carried up, inverting the remaining part of the cystocele, and is brought out through the mucosa on the left. It is tied on the outer surface to the other end of the suture on the right.

At this time the suture, which has been applied for the purpose of lifting the bladder onto the anterior surface of the uterus, is tied. Next the sutures, that bring the cardinal ligaments to the anterior surface of the cervix, are tied.

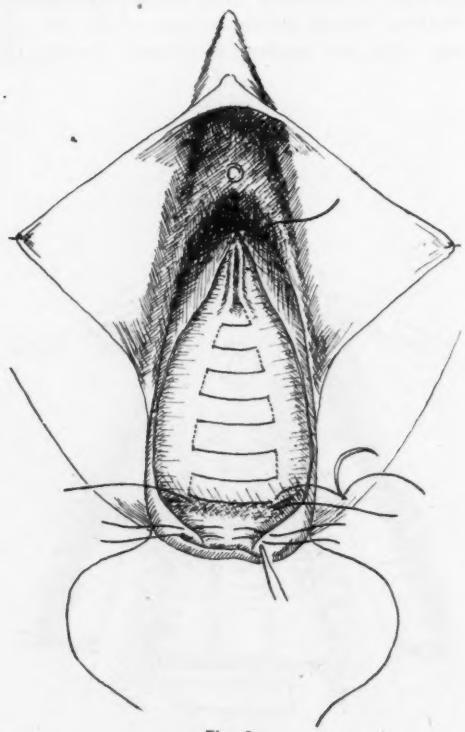

Fig. 8

The pulley sutures have been tied, which pull the urethra well back and snugly under the symphysis. The first row of the continuous Lembert suture has been applied into the musculo-fibrous tissue which covers the bladder. The first four bites of the suture have been drawn taut. Sutures a, b, and c, as in *Fig. 6*, are still not tied.

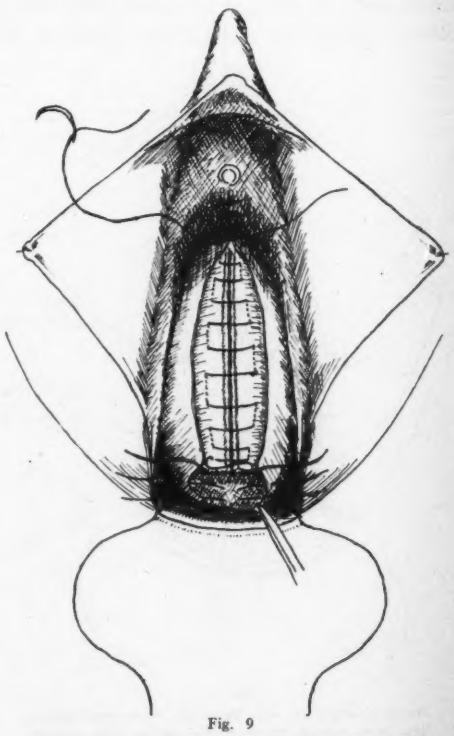

Fig. 9

The first row of the continuous Lembert suture which started on the vagina mucosal surface has been drawn taut, thereby imbricating two-thirds of the cystocele, and the second has been applied, finishing on the vaginal mucosa again, to be tied after the stitch has been drawn tight. Sutures a, b and c, as in former figures.

The vaginal mucosa is sutured across the anterior portion of the stump of the cervix (*Fig. 10*). The vaginal mucosa and the layer of underlying musculo-fibrous tissue are approximated with interrupted sutures of No. 1, 20-day chromic catgut proceeding from above downward.

POSTERIOR COLPORRHAPHY

(*Fig. 11*) Procaine hydrochloride solution is again injected rather deeply into the perineal and levatorani regions and just under the vaginal mucosa that covers the bulging posterior vaginal wall. An inverted T incision is made, the transverse portion being made at the mucocutaneous junction of the perineum. The extremities of this incision should be carefully planned, so that at the conclusion of the perineorrhaphy, the introitus will be ample. The longitudinal incision through the vaginal wall goes, in the midline, from the transverse incision to the top of the defect in the rectovaginal septum.

(*Fig. 12*) The vaginal wall is reflected on each side until the levatorani muscles are uncovered.

If there should be an enterocele present, this is entered and its peritoneal wall is dissected up well above the level of the utero-sacral ligaments, ligated and cut away. The utero-sacral ligaments are sutured together snugly over the rectum.

If the rectocele be large and high a double row of continuous Lembert sutures is applied over the upper part of the rectocele down to the point at which the levatorani muscles are to be approximated. These sutures are applied into the musculo-fibrous tissue and they effect a lift of the rectal wall upward, as suggested by George Gray Ward, at the same time obliterating all dead space. The vaginal wall is pulled from

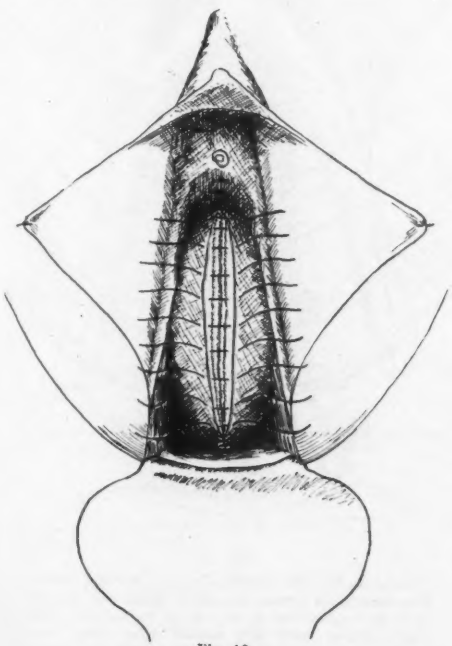

Fig. 10

Sutures advancing the bladder on the uterus, and those approximating cardinal ligaments anterior to cervix, have been tied. The Lembert suture has been drawn taut, and tied. Interrupted sutures have been applied which approximate the vaginal mucosa and the underlying musculo-fibrous tissue.

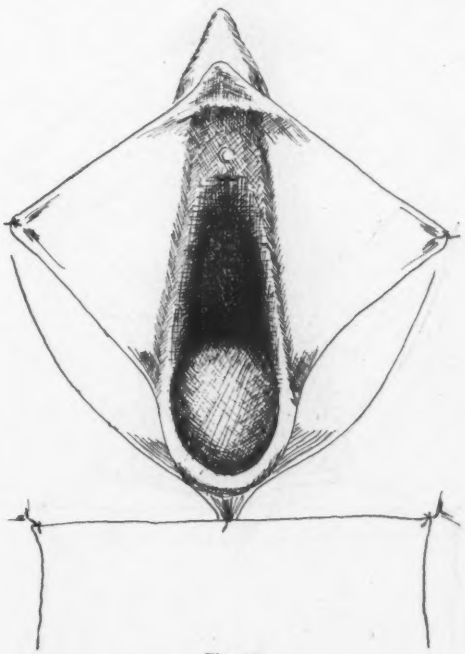

Fig. 11

The anterior colporrhaphy has been completed, and the rectocele is seen. Procaine hydrochloride solution is injected under the mucosa as high as the fault in the rectovaginal wall, and deep into the levator ani regions. Allis clamps are applied to the skin on each side, which marks the limits of the dissection.

each side toward the opposite side and cut in the midline, care being taken to leave sufficient tissue to insure a canal of the desired width (*Figs. 13 and 14*). The cut edges of the vaginal wall are approximated with interrupted No. 1, 20-day chromic catgut sutures which include and also approximate the underlying layer of musculo-fibrous tissue. These sutures are applied down to the point at which the levatorani muscles are to be approximated. At this point is started a series of three or four pulley sutures of No. 1, 20-day, chromic catgut applied as follows: the suture starts on the right going through the vaginal mucosa and the levatorani muscle, picks up bites of the endopelvina lying between the levatorani muscles, then through the levatorani muscle on the left, then back to the right and through the right levatorani muscle, then back to pass through the left levatorani muscle and out through the vaginal mucosa. These sutures are not tied until all are applied.

(*Fig. 15*) At the edge of the perineum a continuous No. 00, 20-day chromic catgut is started on the external surface of the vaginal mucosa, approximating the lower edge of the perineal muscles down to the angle of the perineal skin (*Fig. 16*). This suture is then reversed in direction and carried back to point of start as a subcuticular stitch closing the perineal skin and completing the operation.

The late Dr. Floyd Keene directed my attention to the article by Shaw on the Manchester operation shortly after its publication in the *American Journal of Obstetrics and Gynecology*

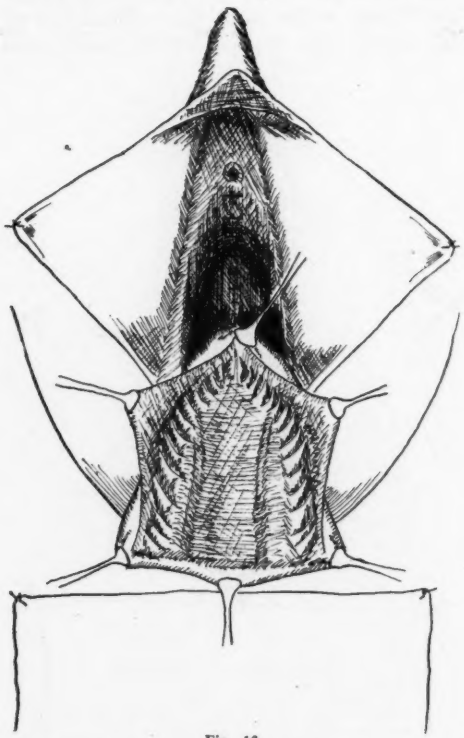

Fig. 12

The vaginal wall has been incised as high as the fault in the rectovaginal wall extends. The endo-pelvina covering the upper part of the rectocele is exposed. The area of levator ani muscles is uncovered.

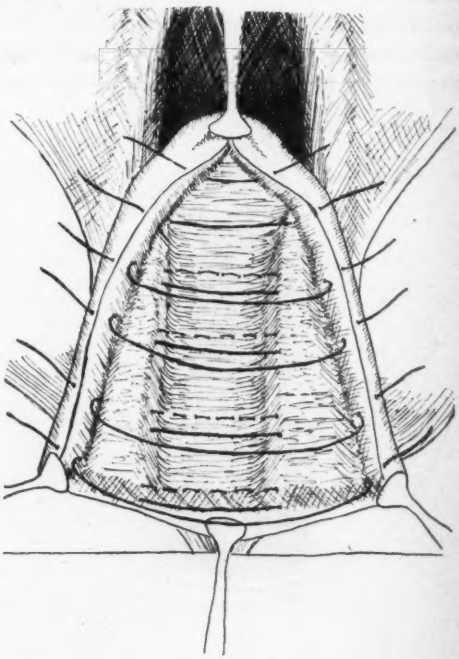

Fig. 13

Perineorrhaphy. The excess vaginal wall has been excised. Two interrupted sutures are shown which will approximate the vaginal wall at the top of the incision. Four pulley sutures have been applied going from right, through the vaginal wall and the levator ani muscle, taking up bites of the endo-pelvina covering the rectum, through the levator ani muscle on the left, back to pick up both levator ani muscles, and out through the vaginal mucosa on the left.

in 1933. Keene endorsed it strongly and demonstrated the operation for me.

The technic, essentially as it has been described, has been used by me for the past ten years, during which time I have operated upon probably more than one hundred cases. On account of the press of work in recent months, the follow-up check on these patients has not been as complete as it should have been. Up until about three years ago I did quite a lot of work in our County Charity Hospital, where a good many of the operations done were vaginal plastics. None of these cases has been followed up. Several such operations were done in two other hospitals, where I have operated only occasionally, which were not followed. In the two hospitals, which I have used for the greater part of my work, the records were carefully checked, and seventy cases were found. Of these, questionnaires were presumably received by sixty-one, whose addresses were correctly located. From these sixty-one patients, fifty-six replies were received. Fifty-one reported that they had been entirely cured of the ailments for which they had been operated upon. One of the other five complained of pain in her flanks, and with her bladder; and another, with a great deal of backache. Three others had bladder irritability.

I have done periodic check-up examinations on many of these patients, and in a few, so far I have found a little more bulging of the bladder than I liked. However, in each case the patient was unconscious of it, and had no symptoms.

Not one patient mentioned incontinence of urine, with which a great many had been plagued prior to the operation. I regret that I did not ask, in the questionnaire, specifically whether or not this symptom had persisted. Those who have come for periodic check-ups have been entirely relieved.

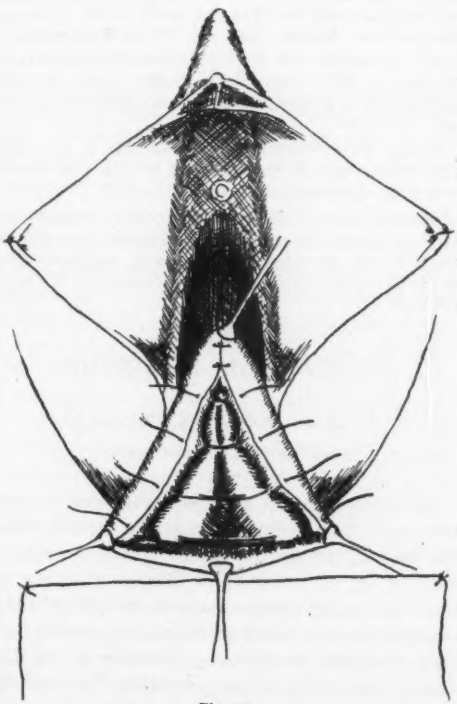

Fig. 14

The interrupted sutures have been tied. The pulley sutures show varying degrees of tension, demonstrating the levator muscles being approximated anterior to the rectal wall. The vaginal mucosa will be approximated anterior to the levator muscles after the stitch is tied.

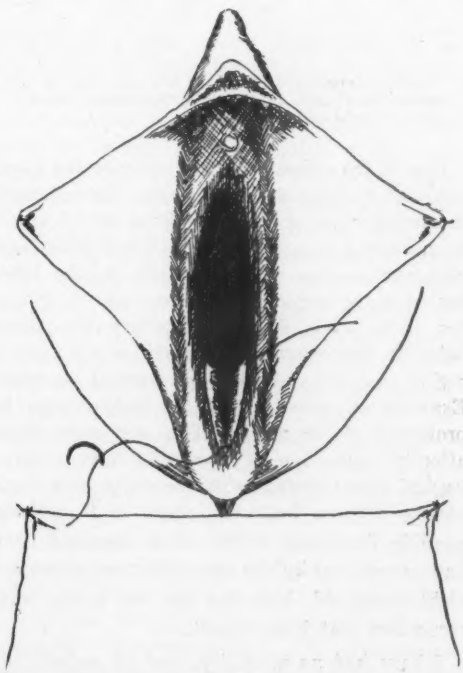

Fig. 15

A continuous suture starts on the vaginal mucosa and approximates the Colles's fascia.

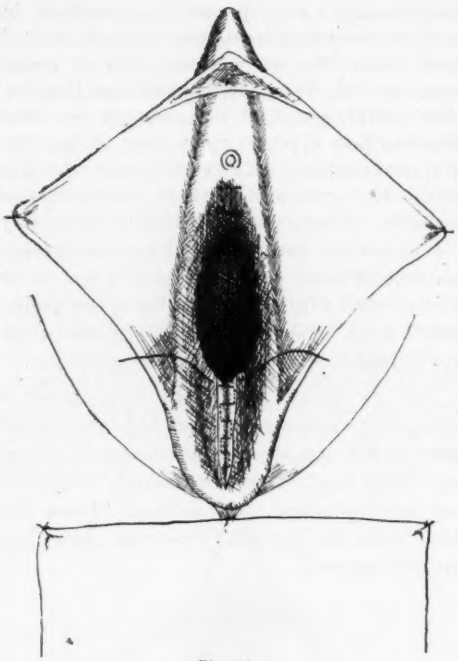

Fig. 16

The same suture shown in *Fig. 15* is continued up as a subcutaneous stitch, and is tied on the vaginal mucosa, concluding the perineorrhaphy.

One of the patients did not reply to the questionnaire because she knew that I did not need the information. She is a woman of 67 years, upon whom I operated nine and a half years ago. Eighteen months ago, just five months after her daughter and granddaughter came to live in her home, while lifting the twenty-five pound baby, she had a sudden sharp pain in the vaginal region, and felt a mass at the vaginal introitus. Examination revealed that she had a recurrent prolapsus of the uterus. This was eight years after her operation. Two months later I did a vaginal hysterectomy, which seems to have completely relieved her symptoms. It is entirely possible that some of the other cases will have had recurrences by the time their operations are eight years old, but thus far this is the only recurrence that I can report.

I have had no mortality, and no patient has been critically ill during convalescence.

1922 Tenth Avenue, South

DISCUSSION (*Abstract*)

Question.—I should like to ask the doctor what he does about the matter of catheterization.

Question.—I should like to ask the doctor what disposition he makes of cervical erosions and cysts, whether he does that before using this procedure, or what method he uses.

Dr. Turlington (closing).—For many years I have not known what to do with the bladder after a vaginoplastic operation. That is what you had reference to, I am sure, in asking about catheterization. For several months I had patients catheterized as infrequently as I could, which was entirely unsatisfactory; then for another several months I used the retention catheter, which was entirely unsatisfactory. Since the sulfonamides have come on the market, I use them, as a great many others do, I am sure, prophylactically, and use a self-retaining catheter in the bladder, and on the second day I start giving the patient 15 grains of sulfadiazine and 10 grains of sodium bicarbonate every four hours. I insist that she take a glass full of water an hour. If she cannot, we give her intravenous fluids. After two days, I cut that down to 7½ grains every four hours, and continue until the fifth day, when we try to remove the catheter. We do remove it if the daily urinalysis report is negative. If it is not, I let the catheter stay in two or three more days, during which time the sulfadiazine is pushed, and practically always it is clear after that time.

Before the sulfonamides were available, I will admit that cystitis, urinary tract infection, was the most terrible plague of these operations.

Another doctor asked about cervical erosions and cysts. We amputate the cervix and remove the diseased tissue in this operation. That, I think, we brought out in the discussion. The diseased cervical tissue is always removed.

CAROTID SINUS SYNDROME*

By WILLIAM KENDRICK PURKS, M.D.
Vicksburg, Mississippi

In recent years it has been abundantly demonstrated that overactivity of the carotid sinus mechanism frequently causes syncopal seizures varying in intensity from simple dizziness or fainting to deep unconsciousness accompanied by convulsions. The latter manifestations have often been mistaken for epilepsy, narcolepsy, cardiac disease, and other serious disorders. Our present

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knowledge of and interest in the carotid sinus reflex is based largely upon two studies. First, there was the work of Hering,[1] who demonstrated experimentally that so-called "vagus stimulation" by pressure in the neck was in reality not due to direct stimulation of the vagus nerve, but to the effect of pressure on the carotid artery, which, in turn, activated the carotid sinus reflex. He also worked out the nerve communications to the carotid sinus and showed that section of the carotid nerve caused disappearance of the reflex. This very interesting work, however, seemed to have no direct clinical application until Weiss and Baker[2] in 1933 described a series of cases in which it was proven that the carotid sinus was responsible for syncopal attacks, such as have been mentioned above. Subsequently, they[3] and many others[4 5] have studied the carotid sinus reflex in health and disease.

There appears to be little doubt that mild symptoms of overactivity of the carotid sinus reflex are frequently encountered in the practice of every physician. Most of them are unrecognized. The incidence of spontaneous major seizures is difficult to evaluate. Weiss and Baker[3] reported 15 such cases in 1933, and in the succeeding three years they saw a total of 56 cases.[4] Smith[6] refers to 85 cases observed at the Mayo Clinic. These and other groups[7] of cases fail, however, to give a definite indication of the frequency of the carotid sinus syndrome. We do have very definite evidence[3 5 9] of the frequency with which overactivity of the reflex may be induced by simple mechanical stimulation. In the population generally we may expect a significant change in pulse rate, blood pressure or electrocardiogram in sixty to eighty per cent. This percentage is greatly influenced by sex, age, and evidence of vascular disease.

CLINICAL SYNDROMES

The symptoms accompanying overactivity of the sinus are principally dizziness, unconsciousness, or mild convulsive seizures. When such attacks are frequent they are truly disabling. It is generally agreed that the symptoms arise from one of three abnormal mechanisms which Weiss and associates[3] originally described. These are as follows:

(1) Cardiac inhibition. This is the most common mechanism. The response varies widely. There may be marked slowing of the heart rate or complete asystole. The latter is usually present in severe cases.

(2) Vasodepression. This reaction may accompany or occur independently of the above. In the latter case there may be marked fall in blood pressure even though the cardiac mechanism is not disturbed.

(3) The cerebral type of response. In these cases there may be no change in the blood pressure or cardiac mechanism and syncope may possibly be the result of a local alteration of the cerebral function.

In the series reported by Weiss and associates[4] the percentage incidence of these three types of mechanism was as follows: (1) Cardio-inhibitory, 34 per cent. (2) Vasodepression, 5.3 per cent. (3) Cerebral type, 60.7 per cent. Most other reports have been concerned with the cardio-inhibitory type of mechanism.

DIAGNOSIS

Diagnosis of the carotid sinus syndrome is quite easy if we suspect its presence in every individual who complains of dizziness, unconsciousness or convulsive seizures. Reproduction of the attack by mechanical stimulation proves the diagnosis. Although there is an element of safety in making the test in the recumbent posture, a greater degree of response will be elicited in the sitting posture. Careful attention must be given to the method of compressing the neck. If the head is turned sharply away from the side to be tested and if the neck is somewhat hyperextended one will locate the bifurcation of the carotid artery just below the angle of the jaw and at the level of the upper surface of the thyroid cartilage. Often the bulbous dilatation of the internal carotid can be easily felt at this point. Pressure directed medially just above this point will compress the internal carotid artery against the vertebral column and the response is usually prompt. Pressure is rarely applied for more than 10 or 12 seconds. The rapidity with which pressure is applied and also the degree of pressure seem to influence the response. It is well to have a stethoscope on the precordium during the testing period and to release pressure as soon as a definite response is elicited. There is comparatively little danger

in the test, although Marmor and Sapirstein[15] have reported one fatality due to thrombosis of the cerebral artery.

PROGNOSIS

It is well for us to remember that the carotid sinus syndrome is rarely a killing disease. Patients may be and usually are greatly disturbed by its presence, but have little to fear so far as mortality is concerned, except as they may become injured by a fall during one of the attacks. One distinct exception to this statement is the danger encountered during surgical anesthesia.[10 11] Most patients with an overactive carotid sinus reflex die of some other disease, chiefly vascular diseases which often accompanies the carotid sinus syndrome.[8] Accurate prognosis requires that we evaluate a number of factors. Congestive heart failure[12] and emotional tension are known to increase the reflex irritability and certain drugs greatly influence the response. The following are said to increase carotid sinus reflex irritability:[4 10 11 12 13 14]

Morphine	Thyroid extract
Nitrous oxide	Excess carbon dioxide
Light chloroform	Anoxia
Digitalis	Eserine
Urginin	Calcium
Nicotine	Salicylates
Strychnine	Acetylcholine
Nitrites	Potassium cyanide

Certain other conditions and drugs apparently decrease the reactivity of the reflex, namely:[4 10 11]

Chloral hydrate	Quinine
Deep chloroform	Hypocalcemia
Barbiturates	Large doses strychnine
Large doses caffeine	Ether
Alcohol	Shock
Procaine	Ephedrine
Atropine	

TREATMENT

The large majority of patients who have only rare or mild attacks require no treatment other than the advice to wear soft, open, and low collars and to avoid any garment that constricts the neck. They should likewise avoid sudden twists or movements of the neck for such motion may stimulate the reflex. If the attacks are frequent and severe it may be necessary to use either atropine or ephedrine. The latter is usually the best tolerated and most useful drug for prolonged use. Its effect in raising blood pressure may, however, at times preclude its use.

Most patients can be controlled by medical means. Such treatment, however, must be continued indefinitely. Unfortunately, also, we have no non-habit-forming drug which will consistently decrease the reflex response in the cerebral type of mechanism.[4] There will, therefore, be a considerable number for whom surgery is the method of choice. The procedure of denervation of the carotid sinus on one or both sides is simple enough to perform. Preliminary novocain injection should be done to test the response. There is considerable danger in section of the carotid nerve, if the blood pressure has previously been high or if the patient's cerebral vessels are poor, because there follows, immediately on cutting the nerve, a sharp rise in blood pressure varying from 30 to 60 mm. Hg. This pressure rise persists for about thirty minutes and then subsides.

If the patient has a tumor, enlarged or calcified gland in the neck adjacent to the carotid sinus, the surgical removal of such masses may frequently cure the patient even though the carotid nerve is not cut.

CASE REPORTS

Case 1.—K. E. B., a man, aged 62 years, complained of attacks of dizziness and momentary unconsciousness of eight months' duration. Attacks occurred every three to seven days and lasted three to five minutes. He had no convulsive seizures, but had often fallen to the ground.

Examination showed no masses in the neck. Carotid arteries were moderately sclerotic. Blood pressure was 140/85. The heart was normal.

Pressure to the right carotid caused immediate loss of consciousness and stertorous breathing lasting about two minutes. The patient said on awakening that he had just had one of his "spells." Left carotid pressure provoked no syncope.

The electrocardiographic changes are illustrated in *Fig. 1.* Right carotid pressure caused a period of auricular asystole lasting 6-3/5 seconds, during which time there were two complexes of ventricular origin. Left carotid pressure produced only slowing of the normal pacemaker.

The administration of ephedrine, 3/8 grain, three times daily resulted in relief and during administration of the drug strong carotid pressure failed to provoke an attack.

Case 2.—J. R., a man, aged 51 years, had his first attack twelve days prior to first observation. On that

date he arose from a chair, fell suddenly unconscious and remained so for five minutes. He had no convulsions. Subsequently he has had two spells of dizziness without loss of consciousness.

Examination showed moderate arteriosclerotic changes in the optic fundus and sclerosis of both carotid arteries, which were easily palpable. There were no masses in the neck. The heart was normal. Blood pressure was 130/70.

Right or left carotid pressure (*Fig. 2*) promptly caused cardiac asystole and momentary unconsciousness.

Ephedrine sulphate, grain 3/8 three times daily, completely controlled the attacks and during administration of this drug carotid pressure failed to cause syncope.

Case 3.—C. A. M., a woman, aged 76 years, complained of fainting and unconscious spells of fifteen years' duration. Attacks occurred about once each week and lasted fifteen to thirty seconds. In the last five years, attacks became more frequent and severe, lasting three to five minutes. There were no convulsive seizures.

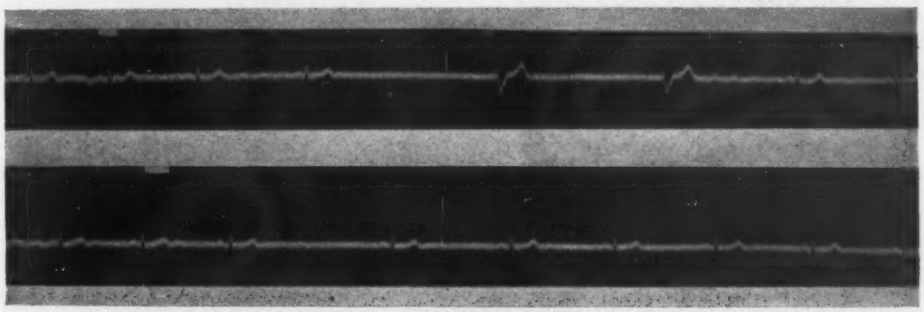
Examination showed advanced atherosclerosis. Carotid arteries were tortuous and showed heavy calcification in x-ray study. There were no masses in the neck. The lungs showed small moist rales at the left base. The heart was enlarged and sounds were of poor quality. Systolic murmur, grade 3, was best heard at the apex. Blood pressure was 160/90.

Right carotid pressure (*Fig. 3*) slowed the heart markedly, but did not produce syncope. Left carotid pressure caused ventricular asystole and momentary unconsciousness.

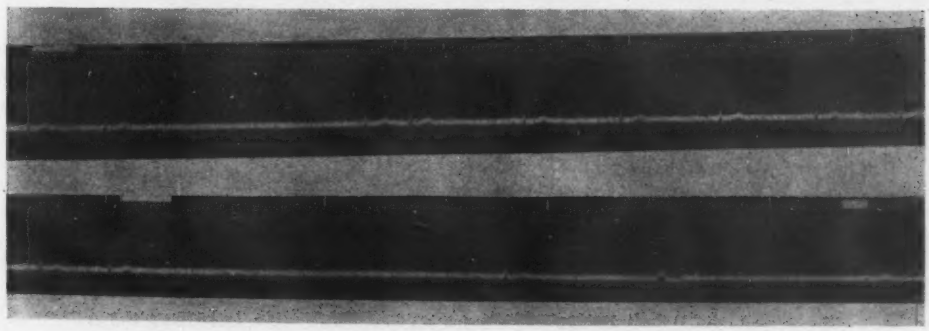
Tincture of belladonna, 10 drops three times daily, decreased the attacks, but carotid stimulation still caused syncope. Atropine, grain 1/100 by hypodermic abolished the cardio-inhibitory reflex, but blood pressure fell from 170/90 to 130/66, following right carotid stimulation and from 170/90 to 120/50 following left carotid stimulation. These changes were accompanied by only slight dizziness.

During the first few weeks of observation the patient developed marked dyspnea and peripheral edema and following administration of digitalis she developed the first spontaneous attack of syncope since the beginning of treatment. Digitalis was omitted. Ephedrine, grain 3/8, was given twice daily, belladonna was continued and attacks of syncope stopped.

Case 4.—J. T. D., a woman, aged 68 years, complained of dizziness and weak spells of six months' duration.



Case 1, K. E. B.
Right carotid pressure (top) caused momentary unconsciousness.



Case 2, J. R.
Right carotid pressure (top), and left carotid pressure (bottom), both caused momentary unconsciousness.

Such attacks lasted from a few minutes to six hours. There had been no loss of consciousness.

Examination showed the mental functions to be somewhat slow but accurate. There was only slight evidence of atherosclerosis. The heart was slightly enlarged. Blood pressure was 150/90. Cholecystograms show the presence of gallstones.

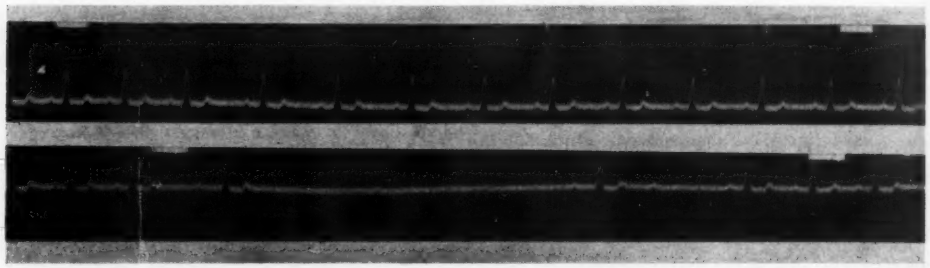
Right carotid pressure resulted in complete momentary loss of consciousness and convulsive movements of the left arm. Left carotid pressure caused cardiac slowing and slight dizziness but no change in blood pressure.

Standard electrocardiogram showed prolonged PR interval and left ventricular preponderance. Right carotid pressure (*Fig. 4*) caused ventricular asystole lasting 6.1 seconds. Left carotid pressure caused marked sinus slowing and several dropped beats.

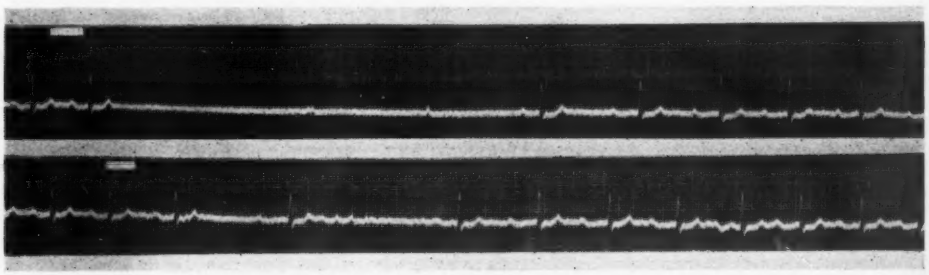
Tincture of belladonna, 10 drops three times daily, controlled the attacks and later she had a successful operation for cholelithiasis.

Case 5.—L. S. a man, aged 51 years, while standing near a curbstone, had suddenly become dizzy and had fallen to the ground unconscious, striking his head against the curb. There was no history of similar previous attacks, though he had had some spells of "weakness" for several months.

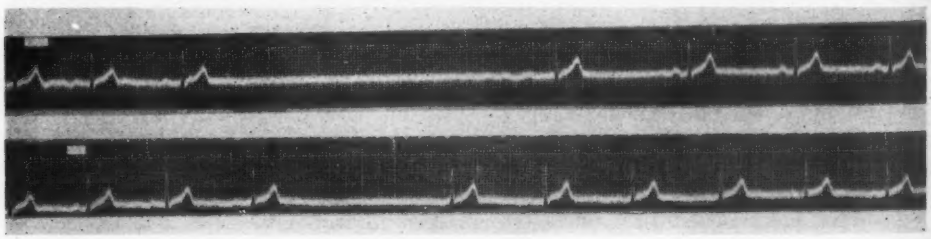
Examination showed his mental state to be somewhat confused. There was a large hematoma over the left occipital region of the skull. No masses were felt in



Case 3, C. A. M.
Right carotid pressure (top) caused slight cardiac slowing. Left carotid pressure (bottom) caused ventricular asystole and momentary unconsciousness.



Case 4, J. T. D.
Right carotid pressure (top) momentary unconsciousness. Left carotid pressure (bottom) slight dizziness.



Case 5, L. S.
Right carotid pressure (top) momentary unconsciousness. Left carotid pressure (bottom) slight dizziness.

the neck. The heart was normal, the blood pressure 110/70.

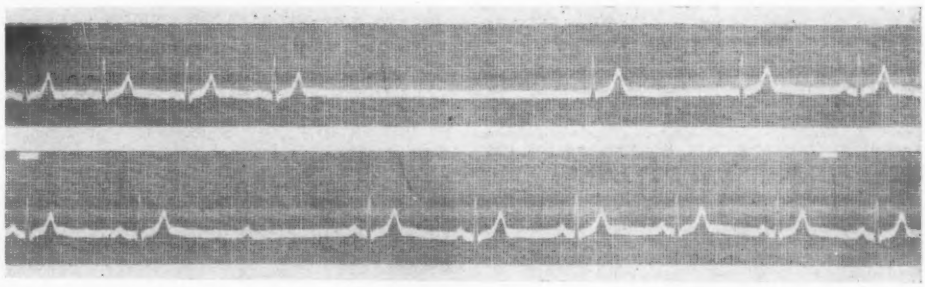
Standard electrocardiogram was normal. Right carotid stimulation (*Fig. 5*) caused complete asystole for four seconds. The patient was in the recumbent posture and experienced no syncope. Left carotid stimulation caused asystole lasting 2.5 seconds. Later with the patient in upright posture similar stimulation caused momentary unconsciousness and jerking movements of the head and neck. Administration of ephedrine sulphate, grain 3/8, three times daily, relieved the dizziness but caused nervousness and was discontinued. Tincture of belladonna, 8 drops, was given three times daily. The patient's subsequent course is unknown.

Case 6.—A. B. K., a man, aged 59 years, first seen on August 9, 1944, reported at least one syncopal seizure several years ago, but was reasonably well until March 1944, when visiting an army camp he suddenly fell unconscious. He was kept at the station hospital for four weeks under a presumptive diagnosis of coronary thrombosis. He continued to spend most of his time in bed for the next several months. On getting out of bed he had frequent syncopal attacks with loss of consciousness, lasting three to five minutes.

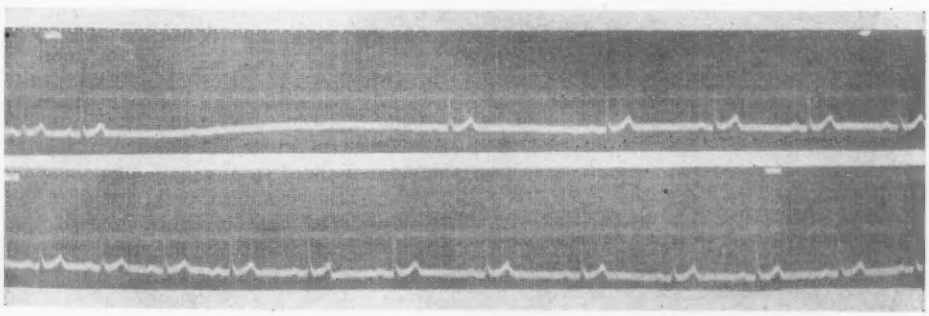
Examination showed no masses in the neck and only moderate carotid sclerosis. Blood pressure was 110/70. His heart was normal in size. There were no murmurs. Standard electrocardiogram was normal except for very large T-waves and slight right axis deviation. Right carotid pressure (*Fig. 6*) caused complete asystole lasting 3.5 seconds and accompanied by momentary loss of consciousness. Left carotid pressure produced partial heart block and marked sinus slowing accompanied by momentary loss of consciousness.

Following the administration of tincture of belladonna, 10 drops three times daily, and ephedrine, grain 3/8, twice daily, the patient had no further seizures and returned to his work as a storekeeper.

Case 7.—J. E., a man, aged 76 years, experienced his first syncopal attack one year ago. At that time he fell from a ladder and was unconscious for five minutes. Four weeks prior to my observation he again experienced dizziness and fell to the floor unconscious. Subsequently there was only slight dizziness. Examination showed no abnormal masses in the neck. The heart was normal. Blood pressure was 130/70. Standard electrocardiogram was normal.



Case 6, A. B. K.
Right carotid pressure (top) momentary unconsciousness. Left carotid pressure (bottom) momentary unconsciousness.



Case 7, J. E.
Right carotid pressure (top) momentary unconsciousness. Left carotid pressure (bottom) slight dizziness.

Right carotid stimulation (*Fig. 7*) caused unconsciousness and a few convulsive movements of both arms and legs. The electrocardiogram showed complete asystole. Left carotid pressure caused slight dizziness and electrocardiogram showed marked cardiac slowing.

Administration of ephedrine, grain 3/8, three times daily, has completely relieved his symptoms.

SUMMARY

(1) Spontaneous carotid sinus syncope is a frequent and important syndrome.

(2) The chief features of the syndrome have been discussed.

(3) Seven cases illustrating the cardio-inhibitory types of response have been reported.

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ECHINOCOCCUS DISEASE*

REPORT OF THREE CASES OF CALCIFIED CYSTS OF THE LIVER

By PAUL L. HUDSON, M.D.
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Recent experiences have suggested to me that Echinococcus disease in native Americans may be more common than is generally suspected. In connection with a recent study of three cases of calcified cysts of the liver, this impression was still further enhanced by the ease with which I found hydatid cysts of the livers in hogs and cattle in Georgia. Usually considered a disease associated with sheep, we must not lose sight of the fact that hogs and cattle are also important intermediate hosts for this parasite.

Magath[1] recently reported that less than 500 cases are recorded in the American literature from 1880 to 1938, and of these less than 25 cases were in natives of this country and Canada.

The cycle of this infection is well known, but because of the rarity with which these cases are diagnosed in this country, the life history of this parasite will be briefly reviewed.[2]

Hydatid disease is world wide in distribution but especially prevalent in Iceland, Central Europe, South Africa, South America, Arabia, China, Japan, Philippines, Siberia, Australia and New Zealand. Echinococcus, or hydatid disease in man, is caused by the larval or cystic stage of the dog tape worm, Tenia echinococcus. The definitive hosts are the dog, wolf and other carnivora. The cat can be infected.[3] The intermediate or cystic stage is usually spent in such animals as the sheep, hog, and cow, but man and other mammals are often infected.

Tenia echinococcus is a tiny tape worm, only 3 to 8 mm. in length. It attaches in the small intestine of the definitive host, most commonly the dog. There is a head, neck, and three to six segments. The head has sucking discs and a double ring of hooklets. The eggs are passed in the dog's feces. They closely resemble the beef tape worm egg and positive identification is made from examination of a segment of the

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parent worm. The eggs are deposited on the ground or contaminate the dog's body from where they gain entrance to the intestinal tract of the intermediate host. There they hatch out, penetrate into the portal circulation and lodge in the liver in 60 per cent of cases, or in the lung in 12 per cent. Next in order of frequency involved are the peritoneum, kidney, spleen, genitalia, brain, and heart. In this new location the larva incysts itself in a very typical manner. A thick outer, hyaline, laminated membrane and an inner friable protoplasmic germinal layer develop, around which the host then forms a connective tissue capsule. By proliferation and budding the inner germinal layer develops brood capsules and scolices with a double ring of 30 to 36 hooklets. Within the mother cyst, daughter and granddaughter cysts form. Thus the parent cyst increases in size at a rate estimated to be 1 mm. a month.[2] They may reach enormous size and contain as many as two million scolices, any one of which if eaten raw by some carnivora, may then develop into the adult tape worm and the cycle is completed. Another variety seen in Europe is not contained in its capsule but extrudes tiny daughter cysts to the outside which metastasize to all parts of the body like a malignant tumor.

The Echinococcus cysts, when observed in the viscera of the animal, may vary from the size of a pin-head to that of a baby's head. As do many other parasitic cysts, they tend to degenerate and become calcified with age. They often become secondarily infected. Such a cyst may be present for years without symptoms unless pressure on some vital structure develops, or unless they become infected and produce symptoms of abscess. From the liver they often perforate the diaphragm and rupture into the lung or peritoneum. Lung involvement is particularly serious. If one ruptures spontaneously or accidentally at operation, death may follow from anaphylactic shock. Foreign writers speak also of the occurrence of anemia, emaciation, weakness and death when a cyst is not completely removed.

We must expect to encounter this disease more commonly with the return of our troops from infested areas abroad. In addition, the sale of meat not properly inspected, such as may come from black market operations, represents an additional source of infection for the dog and cat.

In hope of finding a live cyst from which I could obtain fresh antigen for clinical use, I recently visited a small meat packing house in Atlanta. No sheep were available for examination since few are raised in this area, but I was greatly surprised at the ease with which I could find hydatid cysts in the livers of hogs and cattle (*Figs. 1* and *2*).

These infected livers are thrown out at the packing house when discovered by the Government meat inspectors. It is common practice in the country, however, to throw the unwanted viscera of butchered animals to the dogs, or in the city to bring home a piece of raw liver for the house dog or cat. I was also impressed with how easy it might be to miss infected organs. The larva is at first of microscopic size and takes some time to grow to visible size. The fact that sizable cysts were all found in old animals indicates that the cysts continue to grow over a period of several years. Furthermore, on

Fig. 1
Multiple Echinococcus cysts in liver of hog.

routine inspection only those on the surface are seen and discarded. Thus, the incidence of hydatid disease is more frequent than the finding of grossly visible cysts would indicate. Hogs appear to be infected three times as often as cattle in this area.

Diagnosis of Echinococcus infection in man is often notoriously difficult. Suggestive deformity of the diaphragm may be noted on x-ray examination or if calcification has taken place the sharply outlined cyst wall may be seen. In the absence of calcification, pneumo-peritoneum may be helpful in the diagnosis. Cholecystography may also be of value. Cirrhosis, cholecystitis or abscess may be simulated when the liver is involved, while in the lung it is mistaken for tuberculosis or new growth.

Diagnostic puncture of a cyst is not only dangerous for its likelihood of spreading the infection, but may be misleading as the clear fluid obtained may not contain the characteristic scolices and hooklets. These are best found in the live specimen after surgical approach, by examining a small piece of the germinal layer macerated in saline (*Fig. 3*). Scolices and hooklets can thus be beautifully demonstrated. The microscopic picture is then diagnostic but quite different from that usually seen in text books which generally represent formalin treated specimens. These structures may be seen in the sputum if rupture of a cyst into a bronchus has taken place. Histologic examination of a piece of the cyst wall is diagnostic.

Immunological responses developed by the host have been utilized as diagnostic procedures. Much work has been done on serum precipitin and complement fixation reactions. There is a skin test also and this has been reported positive in 90 per cent of proven cases. False positives, however, have been found. Old cysts may be expected to react in a negative manner because the immune response of the body is often lost after the cysts degenerate.[3] For the above reasons the skin test is not to be relied upon too strongly. The cyst fluid used in these tests loses its antigenic value in a short time and fresh fluid must be obtained. Trituated larvae or adult worms from other species of Cestodes have been found to produce the reaction if fresh Echinococcus antigen is not available.[4] Significant eosinophilia is reported in 25 per cent of cases only. Sometimes the nature of these cysts can be proven only by histologic examination.

This report deals with three cases of calcified cysts of the liver encountered in patients who are natives of Georgia.

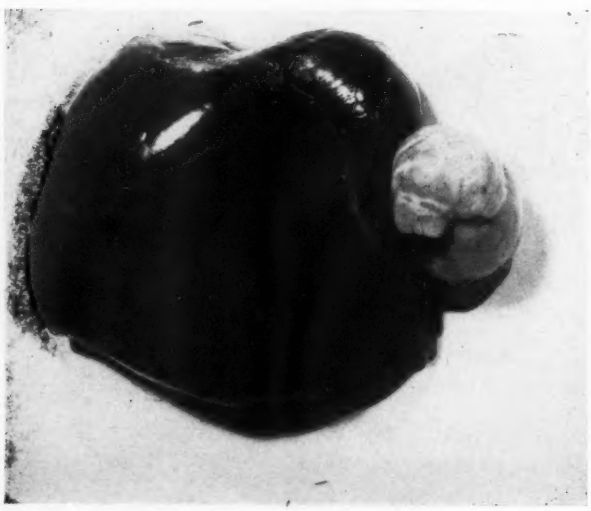

Fig. 2
Multiple Echinococcus cysts in liver of cow.

REPORT OF CASE

Mrs. S. E. C., a white, 67-year-old housewife was seen because of a "carbuncle" on her back which had been present for over 1 year and would not heal. She was born and reared in Georgia and had lived in this city for 30 years. There was no contact with farm animals, but pet dogs and cats had been kept intermittently.

The relevant past history revealed an acute illness ten years before with high fever, chills and acute pain in the liver region without jaundice. The patient was hospitalized at that time for three weeks. Repeated x-ray examinations then were said to have been negative and she was told that she had acute "gallbladder trouble." This illness was not preceded by or associated with any gastro-intestinal symptoms. Since that time the patient said that she has never regained her former health and that she had frequent attacks of "pyelitis" on the right side.

One year ago following a period of malaise and fever, a soft swelling had appeared in the right posterior lumbar region. This was incised by her physician. Copious, creamy, non-odorous pus had drained from it periodically since.

The patient was a small frail woman, not acutely ill. Her temperature was 98, respiration 20, pulse 78, blood pressure 148/75. An inverted cone shaped sinus, 1 cm. across, was noted at the level of the fifth lumbar vertebra, 5 cm. to the right of the midline. The opening of the sinus was sharply defined. Examination of the spine was negative. On palpation a large, firm, round, well-defined mass was felt deep under the liver. On ascultation no murmur or expansile pulsation was noted.[6] Another separate movable mass believed to be the right kidney was felt at the level of the iliac crest.

Laboratory Data.—Urine examination was negative.

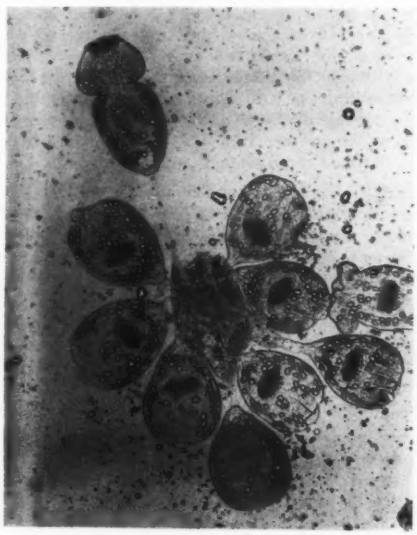

Fig. 3
Live Echinococcus scolices, hooklets invaginated. From fresh preparation, high power magnification.

Fig. 4
Cholecystogram showing relation of cyst to gallbladder and kidneys.

Fig. 5
Calcified cyst of liver showing posterior position.

Fig. 6
Retrograde pyelogram with calcified cyst of liver.

Red blood cell count was 4,070,000, hemoglobin 12.5 grams. White blood cell count was 10,200 with 71 per cent polymorphonuclear leukocytes, 20 per cent lymphocytes, 6 per cent eosinophiles and 3 per cent monocytes. Sedimentation rate was 70 mm. per hour. Blood Kahn was negative. Stools were examined microscopically and by culture for Ameba histolytica, but none were found. Cultures from the sinus tract were negative for tubercle bacilli, Ameba histolytica, and fungi. Only a pure culture of Staphylococcus albus was obtained. Two skin tests with stock Echinococcus antigen were negative. However, when the test was done with freshly prepared antigen the immediate reaction was positive (2 plus).

X-ray examination of the chest was negative except for elevation of the right diaphragm. An anterior-posterior view of the abdomen showed a large cannon ball shadow in the region of the liver. Cholecystograms revealed a displaced but normal gallbladder. The outlines of liver and both kidneys were clearly seen and revealed a large cyst in the posterior portion of the right lobe of the liver displacing the liver upward, forward and medially (*Figs. 4, 5* and *6*). Urological examination revealed both kidneys ptosed to the level of the iliac crest with hydronephrosis on the right side. The urine from each kidney was essentially negative with normal phenosulfonephthalein excretion. The urologist felt that the large mass seen on x-ray examination was not connected with either kidney or adrenal (*Fig. 6*).

Operation.—Since the infected cyst was situated posteriorly against the abdominal wall and was already trying to open there, this was the logical site of attack. Under intravenous "pentothal" and oxygen anesthesia, an incision was made just beneath the twelfth rib. The peritoneum was pushed laterally and downward and stitched so as to wall off the proposed opening. A hard shell-like round mass was exposed. It was aspirated and thick yellowish, not foul pus was obtained. This was sent immediately to the laboratory and was reported negative for scolices, hooklets, tubercle bacilli, fungus and ameba. Cultures were made on ordinary media and also for tubercle bacilli, fungus, and ameba. Staphylococcus albus was grown from this material. The cavity which looked like the inside of an ostrich egg was then aspirated and searched for further evidence. A few pieces of grayish membrane were seen attached to the inside and these were cultured as well as preserved for histological examination, together with pieces through the entire thickness of the cyst wall. Simple tube drainage was inserted and no attempt to remove the calcified wall was made since it was two-thirds buried in the liver, densely adherent and evidently infected, and already well walled off.

Postoperative Course.—For one week there was rather profuse drainage of similar material as that previously described. This was associated with an intermittent fever up to 101.0° F. Sulfadiazine was started on the third postoperative day and the temperature gradually returned to normal on the tenth day. The original sinus had closed after a few days. The drain was removed on the twelfth day and the patient was allowed to be up and about. She went home on the fourteenth day in good condition with only a slight discharge from the wound.

Pathological Report.—The specimens obtained at operation were examined by two competent pathologists who stated independently that the picture was consistent with degenerated Echinococcus cyst.

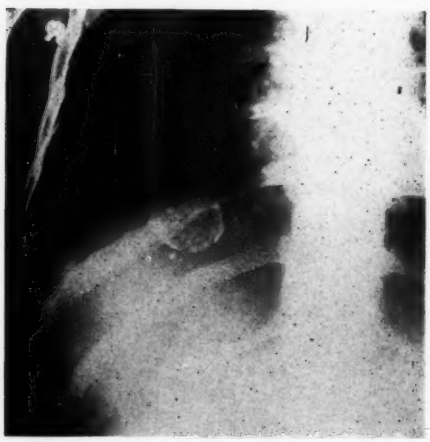

Fig. 7
Calcified cyst of the liver perforating diaphragm.

Fig. 8
Multiple calcified cysts of the liver.

COMMENT

In the differential diagnosis of a well defined calcified round mass in the region of the liver, the following possibilities were considered. These were: gall or kidney stone, gallbladder; pancreatic, mesenteric or renal cyst; aneurysm,[6] tuberculosis, adrenal and renal tumor; and finally, liver abscess and Echinococcus cyst. It was felt that the examinations and tests done had eliminated all possibilities except calcified abscess of the liver or infected Echinococcus cyst. In our experience such sharply calcified outlines as were presented in this case are never seen in liver abscess.

Therefore, it was felt that a calcified Echinococcus cyst with secondary infection was the most likely possibility.

As expected, skin tests in a secondarily infected, degenerated cyst of this age were of doubtful value. The preoperative impression of infected calcified Echinococcus cyst of the liver was not confirmed until histologic examination was made.

For details of the modern treatment of viable Echinococcus cysts reference is made to the excellent recent review of this subject by Holman and Pierson.[7]

In this particular case it is interesting to speculate as to the final disposition of this cyst. Since the patient's past history indicates long standing pyogenic infection of a calcified shell with poor blood supply, it is not expected that a few days of open drainage would clear up the infection. If the cavity should fill up again with pus, aspiration and injection of penicillin should be tried in the hope of sterilizing the cavity. Should these measures fail, periodic aspiration may suffice. Radical removal is contraindicated because of the patient's age, the intimate continuity of the cyst with the liver and the secondary infection.

It has already been stressed that Echinococcus infection may be more common than is generally recognized. While studying this case two other similar cases were brought to my attention.

The second case (*Fig. 7*) occurred in a 26-year-old white laborer living in this area. In the course of a routine examination for pains in the right chest with cough, a calcified cyst was seen by x-ray examination in the upper portion of the right lobe of the liver. This cyst seemed to have partially perforated the diaphragm. Since the symptoms produced in this case are mild and the cyst is now well calcified, it was not disturbed. It is being carefully watched by periodic x-ray examinations.

The third case (*Fig. 8*), which I saw through the kindness of Dr. W. F. Lake, occurred in a 45-year-old white storekeeper who always has lived in a small town in an adjoining county. On routine x-ray examination for some symptoms of dyspepsia four smaller calcified cysts were observed within the right lobe of the liver. These like the second case are now calcified and were not disturbed.

Both these patients also gave no history of contact with sheep. The findings on x-ray examination are essentially identical with those of the first case. Precipitin tests on the serum were negative as would be expected in old calcified cysts.

However, these two cases answer all the requirements of a calcified Echinococcus cyst except that they have not been proven by histologic examination.

CONCLUSIONS

The finding of three cases of calcified cyst of the liver in native Georgians within a short period of time, together with the established presence of Echinococcus disease in our own domestic animals, suggests the possibility that Echinococcus disease may not be as rare as it is usually considered to be in native-born Americans.

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A NOTE ON THE INFLUENCE OF "FOLIC ACID" ON LEUKOCYTE EQUILIBRIUM IN MALNOURISHED PATIENTS*

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and
Charles A. Doan, M.D.
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Not infrequently patients with obvious evidence of nutritional deficiency, confirmed by histories and dietary investigations, are found to have actual leukopenia or low normal circulating white cell levels. Ulcers of the mucous membrane of the mouth occur more frequently and persist longer in such individuals than in normal persons; and a search for causative relationships and corrective dietary measures has been under way during the past two years.

Hematologic observations reported[1] by one of us (C.A.D.) in 1942 in experimentally induced nutritional deficiency states in the Macacus rhesus monkey tended to show that the profound agranulocytic leukopenia occurring under these circumstances could be promptly and specifically corrected by the intramuscular injection of a folic acid concentrate prepared from a yeast autolysate. These data were further confirmed and reported in 1943.[2]

The leukopenia produced in rats by means of feeding purified diets containing from 1 to 2 per cent of sulfaguanidine or sulfasuxidine has been relieved by the use of folic acid concentrates[3] and with crystalline folic acid.[4] More recently crystalline L. casei factor (one of the folic acid fractions) was shown to correct granulocytopenia in rats fed a highly purified diet without sulfonamides.[5] The specific symptoms in monkeys known as "vitamin M" deficiency have been cured by the intramuscular injections of 4-4.5 mgs. of L. casei factor over a period of 3-4 days.[6] This deficiency is characterized by a mild anemia, and a severe agranulocytosis.

On the basis of these animal experiments it was considered worthwhile to investigate the effectiveness of a "folic acid concentrate" on the leukocyte equilibrium in malnourished patients. This work has now been in progress for two years, and with the recent synthesis of L. casei factor it was considered worthwhile to report briefly these human studies.

Twenty-three patients were selected for special study from among those seen at the Nutrition Clinic, Hillman Hospital, Birmingham, Alabama. Total leukocyte counts and differential white cell counts were made at frequent intervals over a period of four weeks so that an accurate baseline might be established. Complete blood counts were then made at 8:00 on the morning of the experimental study prior to the injection of the material to be tested. The counts were then repeated at hourly intervals until 3:00-5:00 in the afternoon. Total erythrocyte counts and electrocolorimetric hemoglobin determinations were included so as to provide a control for any incidental vasomotor phenomena.

Thirteen of 17 patients given the special fraction of liver extract* containing, among other things, folic acid, gave a characteristic response which consisted of a 23-130 per cent increase in total leukocytes as shown in *Table 1-A*. The maximum increase was reached within 2½-5 hours after the injection, and the magnitude reached was greater than that ever found in any single baseline count. It is recognized that spontaneous variations[7] [8] occur in the numbers of leukocytes seen in the peripheral blood, and that such fluctuations are accompanied by a proportionate increase in polymorphonuclear neutrophiles. The control studies of patients investigated here would seem to eliminate this as a sufficient explanation for the phenomena recorded. In each of the thirteen cases, neutrophilic granulocytes were responsible for the rise in total leukocyte count. There was a corresponding left shift in the Arneth nuclear index which was interpreted as reflecting a

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*University of Cincinnati Studies in Nutrition at the Hillman Hospital, Birmingham, Alabama. From the Department of Internal Medicine, University of Cincinnati.

*The expenses of this study were defrayed by a grant from Parke, Davis and Company, and by a grant from the Nutrition Foundation.

*We were assisted in the blood studies by Mrs. Jo Myers, Mrs. Mary Koch, Mrs. Margaret Caldwell, Miss Mary Sax, and Miss Jane Davis.

*This concentrate was supplied by Dr. E. A. Sharpe, of Parke, Davis and Company, Detroit, Michigan.

direct bone marrow delivery. The lymphocytes and monocytes remained essentially constant throughout this period.

Cases 5, 6, 11, and *12* failed to show a response typical of the other cases.

Case 5 had an initial leukocytosis, and this person had a white cell total above 10,000 each time it was checked at rather frequent intervals over a period of two years.

Case 6 showed no leukopenia at any time, and with the dosages of folic acid used there was no evidence of bone marrow stimulation.

Case 11 was found to have a hypoplastic bone marrow which may account for the absence of a response.

Case 12 was a macrocytic-hyperchromic anemia in relapse with myelophthisic leukopenia.

The fact that the white cells in these four cases failed to increase following the parenteral folic acid fraction suggests that the bone marrow under these several conditions may be incapable of responding to any leukopoietic substance of this type.

Two types of control experiments were performed. In the first, adrenalin hydrochloride was administered parenterally and the changes in blood cell totals and differentials were followed.

CHANGES IN LEUKOCYTES FOLLOWING PARENTERAL INJECTION

Case No.	Date	Total W B C			Total P M N			Total Band-Form P M N		
		Initial Count	Maximum Count	No. Hours Required	Initial Count	Maximum Count	No. Hours Required	Initial Count	Maximum Count	No. Hours Required
					A.—Folic Acid Concentrate					
1	7/28/43	4500	7620	5	2000	4750	5	120	1600	6
2	6/27/45	5200	7500	4	2600	5550	4	0	450	4
3	8/15/44	5300	9900	4 1/2	3300	6350	4 1/2	50	700	4 1/2
4	7/ 9/45	5800	9700	2 1/2	3860	6900	2 1/2	58	210	2 1/2
5	5/10/43	12300	12900	3	7850	10370	3	1600	2050	3
6	4/14/44	7550	8500	3 1/6	4550	5800	1 3/4	515	1180	1 3/4
7	4/14/44	5800	8400	3 1/4	4000	6100	3 1/4	50	600	2 1/4
8	6/ 7/43	6370	9000	2 1/2	3850	7120	2 1/2	180	700	2 1/2
9	7/10/45	6700	10400	5	5293	8520	5	67	416	5
10	4/14/44	7350	11125	2 1/4	3350	6800	2 1/4	280	1180	3/4
11	4/17/44	4800	4800	0	2200	2950	1 1/2	280	280	0
12	5/12/44	4700	4700	0	3400	3400	0	25	75	2
13	4/14/44	7900	9750	3	6700	8400	3	500	500	0
14	5/12/44	4100	9500	3	2800	7800	3	50	750	3
15	5/15/45	7300	11250	3 1/2	4200	8250	3 1/2	325	1300	3 1/2
16	6/26/45	5300	11200	2 1/2	2600	8750	2 1/2	106	672	2 1/2
17	7/10/45	6500	10450	3	2860	7300	3	130	400	3
					B.—Crystalline L. casei Factor					
18	7/27/45	3700	6900	3	1813	4209	3	37	828	3
19	7/31/45	3900	5300	2	1482	2491	2	53	156	2
20	8/ 8/45	4900	6550	2 1/2	2107	4061	2 1/2	98	524	2 1/2
21	8/10/45	4050	5600	4 1/2	1539	2744	3 1/2	40.5	65	4 1/2
22	8/10/45	4200	5700	4	2814	4503	4	0	285	4

Table 1

In each of three cases not included in those shown in *Table 1-A*, there was approximately a 100 per cent increase in total leukocytes, but the differential counts show a proportionate increase in all of the cellular types, indicating a spleenic sequestration or reservoir response. Normal saline was also injected intravenously with no significant or consistent variation found in circulating blood cells.

In the majority of clinical cases studied, additional injections were given at weekly intervals for periods ranging from one to five months. Blood cell counts were made with each visit to the Clinic preceding the parenteral injection, and it was found that in the majority of cases there was a maintained elevation in total leukocytes throughout this period. There was also an improvement in the general feeling of well-being in most of these persons, but whether or not this subjective improvement can be attributed to the folic acid content of the concentrate or to some other substances has not been ascertained.

All of these patients, at one time or another have had ulcers of the oral mucous membranes, and it was noted that there were fewer recurrences of these ulcers while the patients were receiving injections of the folic acid concentrate than had previously been the case. Four of the seventeen patients were treated for a year or longer. During that time they had no more than three ulcers per person, whereas before treatment they had had numerous ulcerations with new lesions appearing every few weeks. The authors realize that ulcers of the oral mucous membranes frequently occur in persons who do not have a neutropenia and that persons with a neutropenia may not have ulcers. Nevertheless, the association between neutropenia and ulcerations of the oral mucosa seems to be definitely established in some cases. This relationship has been under investigation by the authors in Alabama and in Ohio for several years.

We have administered crystalline L. casei factor* to five cases of mild leukopenia, with the results shown in *Table 1-B*. *Cases 18* and *19* received 15 mg. and 18 mg. intravenously, respectively, while *Cases 20*, *21*, and *22* each received 20 mg. intravenously. There was a rise in total leukocytes and in granulocytes within two to four and one-half hours comparable to that found with the liver concentrate. There was a decided left shift in *Cases 18* and *20*, a smaller shift in *Cases 19* and *22*, and no shift in *Case 21*. Follow-up blood cell counts on the days immediately succeeding the injections showed that all except *Case 19* had returned to essentially the original level. *Case 19* for three days following the injection had a white cell count above 6000, and this was the highest count that had been obtained in this patient over a period of two months, during which time counts were made at no longer intervals than one week.

These findings suggest that in some cases the use of an intravenous liver concentrate containing folic acid will elevate the total number of circulating leukocytes with a proportionate increase in granulocytes for varying periods. When this change occurs, it is accompanied by a left shift. The administration of L. casei factor intravenously to five patients early in the morning was followed by some rise in leukocyte count in the peripheral blood later in the day. In only one case was this elevation maintained on the following day.*

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*This factor was sent us by Dr. T. H. Jukes and by Dr. Stanton M. Hardy of Lederle Laboratories, Inc., Pearl River, New York.

*While fractionating Reticulogen, Dr. J. K. Cline has isolated a white, colorless material, chemically different from L. casei factor, which has been administered by Dr. Berry and Dr. Spies to a selected group of ten malnourished persons with leukopenia. This series of patients has been studied separately, though the technic was similar; and the rise in the white cell concentration of the peripheral blood has been spectacular. A full report will be published soon.

CONTAGIOUSNESS OF POLIOMYELITIS*

STUDIES IN BACTERIAL METABOLISM: CXXI

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It long has been realized that the prevailing concept of poliomyelitis (infantile paralysis) is incompatible with epidemiological facts. It is believed that the main pathological event of poliomyelitis is invasion of the central nervous system with resulting paralysis. It is assumed therefore that one case of polioparalysis† must take origin from a preceding case just as one case of measles takes origin from a preceding case. This is not true. There is remarkable discontinuity between clinically diagnosable cases of polioparalysis. They are not in sequential menace. The disease and its virus, however, are incontestibly associated. There must be uninterrupted sequence of virus, host to host.

Reconciliation of this discrepancy between sporadic occurrence of cases of polioparalysis on the one hand and uninterrupted succession of virus on the other hand is no mere acadamic matter. It involves principles of microbic transmission from host to host and it invites comparison of poliomyelitis with other, parallel microbic infections within the central nervous system. Viewed in light of these biological factors it will be made apparent that all infections involving microbic invasion of the central nervous system fall into one definite, coherent pattern: a pattern distinguished by sporadic appearance of central nervous system manifestations connected through continuity of inciting agents.

The epidemiological facts of poliomyelitis are these: (1) poliomyelitis is a disease of childhood. (2) A majority of cases of clinically diagnosable poliomyelitis (polioparalysis) occur sporadically, with no history of contact with previous cases. (3) Two cases of polioparalysis in one family are unusual, even though no precautions are taken to prevent cross infection. (4) Clinically diagnosable cases of poliomyelitis (polioparalysis) show little tendency to spread, even in schools or other places of public gathering. (5) Incidence of polioparalysis is no greater among doctors and nurses, in intimate contact with acute cases than it is among the civil population, even though the former are exposed freely to infection. (6) Polioparalysis never has occurred in epidemic proportions; the largest number of cases reported to date in any one year was in 1916, when 29,000 were recorded.* This is a very small proportion of the population of the United States.

From these unequivocal facts drawn from epidemiology, it is possible to make certain deductions about the actual nature of the disease, incited by the virus of poliomyelitis, deductions which are in accord with well recognized epidemiological principles. (1) The virus of poliomyelitis is widely disseminated. (2) Poliomyelitis is endemic in the United States. (3) Poliomyelitis normally is a mild, and clinically undiagnosable disease. (4) It is a disease of childhood. (5) Recovery from infection leaves life long immunity. (6) Polioparalysis, a sinister, but (fortunately) uncommon complication of poliomyelitis, involving the central nervous system (a complication which has given to poliomyelitis all the notoriety it has received) plays a very minor part in epidemiology, and bears the same relation to poliomyelitis that tuberculous meningitis, for example, bears to tuberculosis.

To substantiate this concept of poliomyelitis, it is essential on the one hand to trace the path of invasion of poliomyelitis virus from person to person, and on the other hand to offer explanation for discontinuity of cases of polioparalysis. For the former, a brief discussion of the cycle of perpetuation of pathogenic microbes is necessary. For the latter, comparison of polioparalysis with other diseases of microbic origin involving the central system is pertinent.

Epidemiology of Pathogenic Micro-organisms: the Cycle of Infection. — Perpetuation of any microbe-bacterium or virus- depends upon successful completion of three fundamental steps taken in proper sequence. (1) The microbe must

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†The term "polioparalysis" will be used for convenience of discussion, to designate specifically cases of poliomyelitis complicated with recognizable paralysis.

*It has been estimated that polioparalysis develops in but 1 of 1000 cases of poliomyelitis. The accuracy of this estimation may well be questioned. But the rarity of the paralytic complication is beyond doubt.

reach a suitable host. (2) The microbe must multiply in that host. (3) Descendants of the original invaders, vastly increased in number, must reach other, suitable hosts. Successful interference with any one of these steps is fatal to the microbe, and it puts an end to the infection. This in brief is the course of microbic infection.*

Portals of Entry and of Escape of Pathogenic Micro-organisms from their Host: the Cycle of Invasion. — Generally speaking, with exception of insect borne and venereal diseases, which are outside this discussion, pathogenic microbes enter their host by way of mouth or nose, and they escape from their host either by way of nose and mouth (nasopharynx) or intestinal contents, less commonly in urine. The nasopharynx and intestinal and urinary tracts are channels communicating freely with the outside of the host. Through these tracts, only, are pathogenic organisms received in and passed out of the host, to other hosts. It follows that if the virus of poliomyelitis is to conform to this pattern, and it should, it too must have free access to, and escape from, the patient. But that poliomyelitis virus which is inciting polioparalysis is imbedded deep within the body of the victim. It is growing actually within tissue of the spinal cord, around anterior horn ganglion cells, far remote from any channel leading freely outside the patient. Poliomyelitis virus growing elsewhere in the body does not produce that paralysis which is the hall mark of clinically diagnosable poliomyelitis. The immediate problems, therefore, are (a) to account for presence of poliomyelitis virus deep within the spinal cord, and (b) to provide for outside continuity of virus, patient to patient, to perpetuate itself. It may be noted in passing that cerebrospinal fever (epidemic cerebrospinal meningitis) presents precisely the same problem. Its solution is exactly the same as that for poliomyelitis.

It is a well attested fact that microbic invasion and infection within the central nervous system may occur sporadically during the course of almost any acute contagious disease. Thus, typical clinical cases of typhoid, tuberculosis (especially in children), measles, pneumonia, streptococcus and Torula infections, to mention a few, may be complicated by central nervous system infection. This secondary invasion of the cerebrospinal axis may occur somewhat more frequently in some of these diseases, less commonly in others, but the significance of course is the same. The important detail to have in mind is that these secondary, errant excursions of microbes which penetrate and grow deeply within the body are regarded, very properly, as clinically serious, but epidemiologically purposeless deviations from their normal routes of infection and transmission. These errant organisms are isolated. They cannot escape. They die eventually, often killing their host, but they do not leave descendants which can reach outside the body and thereby perpetuate themselves as primary invaders of the central nervous system. This is very important. It prevents building up of special affinity for central nervous system growth through series of hosts, with increasingly disastrous results. It should be emphasized in this connection that current laboratory strains of poliomyelitis virus have been perpetuated through direct inoculation into, and deliberate withdrawal from central nervous systems of monkeys in series. This technic circumvents natural hazards of transmission and it emphasizes whatever propensities the virus may have had originally for central nervous system growth. But this unnatural propagation certainly weakens, perhaps destroys, subsequent ability of the virus to infect through normal channels.

Evidence thus far adduced would seem to support this contention that invasion of the central nervous system by any microbe is fortuitous rather than habitual: that it is a casual incident complicating primary disease located elsewhere in the body rather than an essential pathological factor in transmission of contagious disease. This contention would place cases of polioparalysis (and cases of cerebrospinal fever) in the same epidemiological category with tuberculous, streptococcic, or other sporadic, occasional spinal cord infection. It will be recalled that tuberculous meningitis, for example, is not contagious. There never is sequence of cases of tuberculous meningitis. Epidemics of tuberculous meningitis simply do not occur. Continuity of tubercle bacilli from host to host is maintained through typical clinical cases of

*Details of transmission, specific for each micro-organism, are omitted in interest of clarity of discussion.

tuberculosis. Similarly, and for the same biological reasons, epidemics of polioparalysis do not occur. Polioparalysis is not contagious. It results from fortuitous invasion of the spinal cord by the virus of poliomyelitis. It is not an intrinsic attribute of poliomyelitis.

Discussion thus far accounts for sporadic occurrence of polioparalysis. It does not offer a clue to the pathogenic properties of polio virus other than that, growing around anterior horn ganglion cells, it induces degeneration and paralysis. Clinicians and epidemiologists have been impelled to modify their original belief that clinical (paralytic) poliomyelitis is the primary pathological manifestation of infection with the virus of poliomyelitis. More and more emphasis has been placed upon "mild, atypical, abortive and missed" cases in endeavour to bridge the hiatus between "typical" paralytic cases of the disease. None of these "mild, abortive, atypical or missed" cases can be diagnosed surely. Their occurrence has been required through logic rather than through observation. They are mentioned usually only in periods of unusual prevalence of polioparalysis, when, often, patients present vague symptoms of illness, not uncommonly preceding the onset of paralytic symptoms. These vague symptoms, malaise, fever, respiratory or gastrointestinal disturbance, are not at all specific. They might follow almost any mucosal infection by a microbe of low virulence. They are not incompatible with mucosal invasion by the virus of poliomyelitis. At first sight this might appear to imply that poliomyelitis is an intestinal infection. Some weight is added to this possibility through discovery of the virus in feces of frank cases of polioparalysis, in feces of at least some of the "mild" cases which do not progress to paralysis, and in sewage draining from hospitals or houses where such cases are confined. At best this discovery shows the resistance of the virus to bacterial competition. Poliomyelitis virus has been detected also in the nasopharynx of acute cases of poliomyelitis, in paralytic cases of long standing and in nares of contacts with paralytic cases. Inasmuch as the nasopharynx is superior to the intestinal tract, it may be inferred that the nasopharynx is at least as important as the intestinal tract for lodgment and growth of virus, and other available evidence places poliomyelitis in the group of diseases air borne or transmitted through direct contact.

Carriers of poliomyelitis virus frequently are mentioned: they differ from typhoid carriers in some respects. They do not arise necessarily from recovery to infection with the virus; they are more commonly susceptible to infection. Carriers of poliomyelitis virus far outnumber cases of polioparalysis and they are most numerous about cases of poliomyelitis. On the other hand, cases of poliomyelitis do not appear to develop away from contact with carriers.

In summary, the virus of poliomyelitis is widespread. Its normal habitat is the mucosa of the nasopharynx, but it may develop in the intestinal mucosa. It is usually air borne but it may be transmitted also through direct contact, possibly through media contaminated by infected feces. It is spread chiefly by carriers, by "mild, atypical, abortive or missed cases," also by virus resident in the nasopharynx of paralytic cases. Recovery from infection leads usually to life long immunity.

The normal uncomplicated disease poliomyelitis is endemic, wide spread and contagious. It rarely is diagnosed clinically unless complicated with polioparalysis. Poliomyelitis is a disease of childhood. Adults for the most part are immune. The symptoms of poliomyelitis, in nonparalytic cases are: fever, malaise, gastrointestinal or respiratory irritability. Polioparalysis is a very serious, but fortunately uncommon complication of poliomyelitis, involving the nervous system. It is not, per se, contagious, but the nasopharynx of a case of polioparalysis harbors poliomyelitis virus. Therefore polioparalytic cases may be foci for infection.

All microbic infections of the central nervous system: polioparalysis, tuberculous, typhoid, measles or other meningitides (including cerebrospinal fever) are sporadic, unentailable complications of primary infection elsewhere in the patient. They are, of themselves, of no epidemiological importance.

THE ROLE OF THE ADRENAL IN THE WATERHOUSE-FRIDERICHSEN SYNDROME*

CASE REPORT

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The concept that massive adrenal hemorrhage occurring in the course of septicemia (usually meningococcic) is the cause of the dramatic death of these patients has been accepted by most observers for many years. More recently, case reports have appeared in the literature in which recovery from fulminating septicemia occurred following the use of adrenal cortical extract and/or desoxycorticosterone[1 2 3 4]. The inference is drawn that recovery was because of this therapy. This has led to the general impression that replacement therapy (adrenal cortical extract) is the principle agent in recovery.

This hypothesis as to the cause of death in these cases is not tenable in view of animal experimentation and clinical case reports. The literature on bilateral adrenalectomy in experimental animals is confusing.[5] There is, however, general agreement that the dog is the most satisfactory animal for study as it, like man, practically never has any accessory adrenal cortical tissue. Many factors can influence the operative mortality associated with bilateral adrenalectomy in the dog; but symptoms referable to adrenal insufficiency usually do not appear for several days, even during complete fasting. With high sodium, low potassium diets, these symptoms may be delayed for several months. There is no convincing evidence in the experimental work reported to date to support the implication in human cases that hemorrhage in the adrenal glands plays a significant role in the cause of death within 24-48 hours. Further, there are no reliable clinical or laboratory data whereby adrenal hemorrhage can be predicted. To substantiate this contention and especially to present evidence bearing upon the concepts of therapy discussed above, the following cases are reported:

Case 1.—(A-4317). A white girl, age 2½ years, was admitted to Watts Hospital on March 27, 1943. She was well until 6 a.m. on the day of admission when she awoke vomiting. A few hours later a high fever developed and by midafternoon numerous small petechiae had appeared. On admission the temperature was 106° F., there were many petechiae scattered over the entire body. The child appeared acutely ill. Blood pressure was 90/60. There was no neck stiffness. A lumbar puncture produced a clear fluid with a cell count of 9. A culture of this fluid showed type 2-A meningococci. A blood count was 90 per cent hemoglobin, 4,600,000 red cells, 4,500 white cells, polymorphonuclears 41 per cent, lymphocytes 59 per cent. Shortly after admission the hemorrhagic areas over the skin became large and began to coalesce. A diagnosis of Waterhouse-Friderichsen syndrome was made. An attempt to obtain adrenal cortical extract was unsuccessful. She was given 1 gram sodium sulfadiazine intravenously and 2 grams by mouth; also 20,000 units of meningococcus antitoxin and 150 c. c. citrated blood. Despite this therapy she became steadily worse and expired 12 hours after admission and 22 hours after the onset of symptoms.

Autopsy Findings.—The necropsy, performed five hours after death, revealed a well nourished child with conspicuous areas of hemorrhagic rash on the face, ears, shoulders, arms, legs, and buttocks, and scattered similar areas over the trunk, back and abdomen. The peritoneal cavity contained a slight excess of free fluid (less than 50 c. c.), and the retroperitoneal tissue was edematous. There were petechial hemorrhages in the mucosa of the stomach and small intestine. The adrenals were approximately normal in size but were dark red in color. Permission for examination of the central nervous system was not obtained. The only abnormalities noted on microscopic study were massive hemorrhagic necrosis of both adrenals, involving both cortex and medulla, and acute lymphadenitis of the retroperitoneal lymph nodes.

Case 2.—(A-43-60). A white girl, age 7 years, was admitted at 8 a.m., December 29, 1943. This child complained of not feeling well the night before admission. At 6:30 a.m., on the day of admission, the parents were unable to arouse her and, therefore, brought her to the hospital. On admission she was comatose, there were many petechiae scattered over the entire body, the skin was cold and clammy. The blood pressure was 80/0. There was no neck stiffness. Lumbar puncture revealed a clear fluid with cell count of 2. A culture of this fluid did not contain any growth. The

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*From the Department of Pediatrics and Pathology of Watts Hospital, Durham, North Carolina.

blood culture was positive for meningococci. The blood nonprotein nitrogen was 35 mg. per cent, glucose 120 mg. per cent, carbondioxide 67 volume per cent, hemoglobin 96 per cent, red cells 4,800,000, white cells 11,700, polymorphonuclears 75 per cent, eosinophiles 1 per cent, monocytes 2 per cent, lymphocytes 21 per cent. The urine contained a trace of albumin but was otherwise negative. Shortly after admission convulsive movements of the body began and these continued intermittently until death. Therapy for the forty-eight hours consisted of sodium sulfadiazine intravenously 5 grams, blood plasma 300 c. c., 5 per cent glucose in saline 3,700 c. c., "cortate" 5 ampules, epinephrine 1 c. c., meningococcus antitoxin 30,000 units. There was no indication of improvement following any of these procedures and she expired on December 31, 1943, fifty hours after admission.

Autopsy Findings.—(Four hours post-mortem). The child measured 120 cm. in length and appeared well nourished. There were massive numbers of dark-red hemorrhages, varying from pinpoint to 10 mm. in diameter, especially marked over the arms and legs but also present on the thighs, forearms and face, and in the conjunctivae and mucous membranes of the mouth. The peritoneal cavity contained about 50 c. c. of clear fluid and there were a few petechial hemorrhages in the serosa of the mesentery and small intestine. Similar petechial hemorrhages were seen in the septal endocardium of the left ventricle. Both adrenals were normal in size and showed no evidence of hemorrhage. The brain appeared grossly normal and the leptomeninges were smooth and shiny. Histological study revealed a few scattered hemorrhages in the lungs, but no hemorrhage or necrosis in the adrenals, and no exudate in the leptomeninges.

These two children presented essentially the same clinical picture yet necropsy revealed adrenal hemorrhage in one and none in the other.

Case 3.—(No. 40141). A white boy, age 6 years, was admitted April 25, 1944, at 5 p.m. The boy was apparently well until 1 a.m. on the day of admission when he awoke vomiting and complaining of headache. Six hours later he felt well enough to play about the house but twelve hours later began vomiting again and appeared acutely ill. He was taken to his local physician and while en route had a convulsion. On admission to the hospital his temperature was 103.6°. He was stuporous, dehydrated, the pupils were fixed, the neck was stiff, the skin was pale and clammy and he appeared moribund. Lumbar puncture revealed a cloudy fluid with 6,500 cells and marked increase in globulin. Culture of this fluid resulted in growth of meningococci. Hemoglobin was 68 per cent, red cells 3,750,000, white cells 13,500, polymorphonuclears 84 per cent, lymphocytes 15 per cent, monocytes 1 per cent. The child was given 2½ grams sodium sulfadiazine and 500 c. c. glucose at once and 3 grams sodium sulfadiazine within the next twelve hours. By this time he was conscious and taking fluids by mouth. His temperature was down to 99.6° F., and because he voided grossly bloody urine the sulfadiazine was discontinued. This was never resumed because of progressive improvement. After administration of 6th molar lactate and 10 per cent glucose, he voided freely and except for herpetic eruptions about the mouth the remainder of his course was uneventful. He was discharged twelve days after admission, well.

Case 4.—(A-43-33). A white girl, age 1 year, was apparently well until fourteen hours prior to admission when she became irritable, refused food and later developed a rash. The parents were unable to wake her when they started to bed and so brought her to the hospital. On arrival at the hospital the child was dead. On gross inspection the body revealed many large hemorrhagic areas scattered over the trunk and extremities. A tentative diagnosis of Waterhouse-Friderichsen syndrome was made and permission for autopsy was obtained.

Autopsy Findings.—(Seven hours post-mortem). A well-nourished female child measuring 73 cm. in length and weighing about 12 kilograms, showed a striking purplish hemorrhagic rash, with the individual spots varying from 1 to 15 mm., on the skin of the chest, abdomen, face, upper arms and thighs. Petechial hemorrhages were noted in each conjunctival sac. There was no excess of free fluid in any of the serous cavities. Small hemorrhages were present in the serosa of the intestines and mesentery, and when the intestines were opened a few petechial hemorrhages were noted in the mucosa of the ileum. The left adrenal measured 40 x 30 x 6 mm. and the right measured 35 x 30 x 6 mm. in overall dimensions. Both externally and on section each adrenal was dark red and obviously hemorrhagic. Two post-mortem blood cultures (seven hours post-mortem) failed to yield any growth. Permission for examination of the central nervous system was not granted. Microscopic study did not add anything to the above findings.

Case 5.—(A-44-1). A white woman, age 30 years, 8 months pregnant, had had "flu" about two weeks prior to admission from which she had apparently recovered. About nineteen hours before she was seen she had a hard shaking chill and subsequently a skin rash developed. She was seen by her physician who advised immediately hospitalization but she died in the ambulance on the way to the hospital. No fetal heart sounds were heard so cesarean section was not done.

Autopsy Findings. — Necropsy (three hours post-mortem) showed a slightly obese woman with symmetrically enlarged breasts and the fundus of the pregnant uterus palpable 4 cm. below the xiphoid process. There were conspicuous petechial hemorrhages in the skin of the trunk and extremities, and a few similar hemorrhages on the face and neck. Petechial hemorrhages were also noted in each conjunctival sac and in the mucous membranes of the mouth. The subcutaneous fat varied from 2 to 5 cm. in thickness. The peritoneal cavity contained 50 c. c. of clear fluid, and petechial hemorrhages were noted in the mesentery, serosa of the intestines, parietal pleura on both sides, epicardium, endocardium of the left ventricle, mucosa of the bladder,

and in the small intestine. There was an intense tracheobronchitis which extended down into the finer ramifications of the bronchial tree. Each adrenal appeared about half again its normal size, and both externally and on section each adrenal was composed of dark red hemorrhagic tissue. There was no permission for examination of the head but a segment of spinal cord from the lower dorsal portion failed to show any gross or microscopic changes.

Cultures of the maternal and fetal (umbilical cord) blood both contained meningococci, Type II-A. The fetus measured 30 cm. in crown-rump length and 46 cm. in crown-heel length. It weighted 2,300 grams. Except for petechial hemorrhages in the pleura, pericardium, thymus, and lungs, no abnormalities were noted. Both fetal adrenals appeared normal on gross and histological examination.

SUMMARY

Five cases are reported, one of meningococcus meningitis in which the patient appeared moribund on admission but recovered following intensive sulfadiazine therapy. Four of the cases were diagnosed clinically as Waterhouse-Friderichsen syndrome and the significant necropsy findings on these are presented. Only three of these patients had the massive adrenal hemorrhage necessary to fulfill the criteria for the diagnosis of this syndrome. There was nothing in the clinical or laboratory data to distinguish the case that failed to meet the criteria from those which did.

One case is unique in that the typical symptoms with positive blood cultures (meningococcus Type II-A) and massive adrenal hemorrhage occurred in a thirty-year-old woman who was eight months pregnant. The fetal blood culture was positive for the same organism but the fetal adrenals appeared normal. This case provides the human counterpart of the experiments of Stewart and Rogoff,[6] who showed that bilateral adrenalectomy was without effect in pregnant dogs because ample cortical hormone was supplied by the fetal adrenals.

The findings in this unique case, plus the considerations discussed above, corroborate those of Thomas and Leiphart[7] to maintain the following conclusions:

(1) The currently accepted view that death in cases of Waterhouse-Friderichsen syndrome is due to adrenal insufficiency secondary to hemorrhage in the adrenal glands is untenable.

(2) The indications for adrenal cortex therapy are as great in all cases of severe septicemia and toxemia as they are in cases of Waterhouse-Friderichsen syndrome.

(The authors express their appreciation to Dr. F. N. Bowles for the privilege of reporting Case 5.)

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THE TREATMENT OF ASPHYXIA*

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Asphyxia is a chemical phenomenon. In the severe forms of this disorder the blood is almost depleted of oxygen, there is an increase in the partial pressure of carbon dioxide, and there is a sharp rise in blood lactic acid. While these changes in the lactic acid, pH, and carbon dioxide tension are marked, it should be remembered that they are entirely secondary and that the primary blood chemical change in asphyxia is an extreme reduction in the oxygen content of the blood.

Severe hypoxia is quickly followed by extinction of life; and lesser degrees of oxygen deficiency rapidly manifest themselves in anatomic and physiologic disorders and sometimes result in permanent damage.

It is, therefore, obvious that the treatment of any oxygen deficiency state calls for immediate and rational treatment; and this means supplying oxygen to the tissues.

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Waters[1] has said,

"Practitioners of medicine rush to the telephone to call rescue squads from the police and fire departments while patients die who could be rescued. To the disgrace of present day medical education, sudden failure of respiration is not a rare cause of death in the wards and operating rooms of the modern hospital."

Behnke[2] has aptly said,

"The vast body of knowledge concerning respiration stands in contrast to the lack of organization and equipment for the initiation and maintenance of adequate breathing."

Volpitto and Torpin[3] have called attention to the bewilderment of the average physician by the multiplicity of theories and methods for reviving the asphyxiated newborn.

The size of the clinical field presented by problems of asphyxia, when infants are included, is shown by the fact that probably 3 to 4 times as many such deaths occur as from automobile accidents.

In theory there is no difference in the treatment of asphyxia in infants and adults. Practically, however, full preparation can be made for the care of asphyxia of the newborn, because its time and place can be predicted, while adult asphyxia may occur anywhere and at any time.

For this reason it becomes a matter of convenience to consider the resuscitation of infants and adults separately.

INFANT RESUSCITATION

The total infant mortality in the first day of life in the United States is more than 110,000 yearly. The prime factor in infant deaths in this first day of life is asphyxia. It is not possible to estimate the morbidity, but recent investigations[4 5] have shown that it is enormous.

It is not the purpose of this paper to discuss the etiology of asphyxia; for this the reader is referred to the excellent treatise by Eastman.[6] Here the main concern is to call attention to some recent advances in the treatment of this condition.

Prevention of asphyxia calls for good prenatal care and management of labor, great care in the employment of sedatives, and the avoidance of oxygen deficiency during anesthesia. Emphasis must be placed on the carrying out of a rigid routine of resuscitative care immediately after birth.

The problems of treating neonatal asphyxia in no small measure revolve around the many faulty practices which are widespread. Among these may be listed the following: swinging the baby, dilating the sphincter, spanking, dousing with ether, hot and cold tubs, and all other forms of external stimulation. Because of the danger of brain hemorrhage it is self-evident that to hold a baby head down is exactly the wrong thing to do.

Alpha-lobeline, metrazol, picrotoxin and coramine as well as all other so-called stimulants have no place in the treatment of apnea at birth because their effect on respiration is nil in the presence of anoxia; and it has been shown, the severe forms of apnea neonatorum are regularly associated with anoxia.[7]

Mousel and Essex[8] in working with these drugs have found that not only are they of no value in stimulating respiration and circulation when these centers are depressed, but that they actually increase the depression, often cause convulsions and they may even cause sudden cessation of respiration and death.

In experimental asphyxia pure oxygen is superior to carbon dioxide-oxygen mixtures as a resuscitating agent.[9 10] The addition of carbon dioxide in the treatment of apnea is not only superfluous; it is actually harmful. There is no lack of carbon dioxide in such cases. When the medullary centers are damaged, carbon dioxide is a depressant.

Manual methods of artificial respiration should not be attempted in the resuscitation of the apneic newborn for the simple reason that one cannot express air from an airless lung and damage to the viscera and ribs occurs not infrequently.

The respirator chamber types of appartus are of little or no value in the treatment of apnea neonatorum. Murphy and Bauer[11] and others report that the lungs show little or no aeration following the use of such apparatus.

The pulmotor types of resuscitators are of the automatic suck and blow principle; they are not efficient in the treatment of apnea neonatorum. The lungs of these patients have never contained air and the machines, upon meeting

the resistance of the atelectatic lungs, trip back and forth without inflating the lungs sufficiently.

It is, of course, necessary to know what to do as well as what to avoid. Since most babies are born in hospitals, it is obvious that adequate apparatus for treating this condition should be made available. Here is an opportunity not only to keep asphyxial mortality at an absolute minimum, but also to prevent many of the complications which later arise as a result of asphyxia.

ESSENTIALS OF TREATMENT

The essentials of successful treatment of asphyxia neonatorum are maintenance of body temperature, correct posture for maintaining an open airway, clear air passages, and the administration of oxygen intermittently under positive pressure or continuously at atmospheric pressure.

An apparatus for the resuscitation of apneic newborn babies was first described by Kreiselman, Kane and Swope in 1928.[12] This apparatus has since been improved and additions have been made so that it now embodies in one compact unit all of the requisites for the successful treatment of asphyxia of the newborn.[13]

Body heat is maintained by a thermostatically controlled, electrically heated bassinet. The correct posture is obtained by adjusting a tilting platform on which the baby is placed. Clear air passages, a prerequisite to any satisfactory method of artificial respiration, are maintained by an effective, electrically driven aspirator.

Oxygen is supplied to the lungs intermittently at a carefully controlled and predetermined pressure. This pressure may be regulated up to 16 mm. of mercury, and is indicated at all times by a water manometer gauge, which also acts as a water safety valve and makes it impossible to apply too great a pressure. The average pressure used is 12 mm. of mercury. The rhythm and rate are controlled by the operator.

A rubber face mask fits over the nose and mouth, and at its apex apertures are provided for admitting the oxygen. On the inside of the face mask there is attached a stiffly flexible rubber airway, or breathing tube, which extends over the tongue into the pharynx. A valve on the face mask is so designed that there can be no interference with voluntary efforts at breathing. Continuous flow oxygen is available through a mask which has no valves or bags to get out of order, or to interfere with respiration. There is also provided a small head tent for administering oxygen over longer periods.

ROUTINE TREATMENT

The routine in caring for the newborn in hospitals in which this apparatus is in use is as follows:

As soon as the cord is cut the baby is placed in the heated bassinet in a 15° Trendelenberg position. The mouth and pharynx are cleared at once with the aspirator, and if the baby does not breathe spontaneously, or if it is cyanosed or pale, oxygen is given without delay.

A common error is waiting to see what will happen. Do not wait. Supply oxygen to the tissues immediately. No harm can be done by so doing, but delay may be fatal or may result in irreparable damage to the central nervous system. Progression of asphyxia may proceed with extreme rapidity. Therefore time is of utmost importance in the treatment. It is easy to correct mild asphyxia but difficult to correct it when it becomes profound.

If the baby is not breathing, oxygen should be supplied with the resuscitator by placing the mask over the nose and mouth with the airway over the tongue. The head should be extended and the chin held up in order to maintain a clear airway. This is very important. Depress the valve lever on the mask and hold it down long enough for the lungs to be inflated. Then release the lever and the lungs will deflate because of their own elasticity. Do not remove the face mask, for the expired gas will escape through the mask valve. The lever should be held down for about two seconds, for it is then that the oxygen is taken up by the blood stream. The lever is then released and about two seconds are allowed for the lungs to deflate. The rate should therefore be about 12 to 15 inflations per minute.

In deeply asphyxiated babies, breathing efforts will begin usually with spasmodic inspiratory efforts, which do not take in air. These efforts should be carefully watched and the inflations synchronized with each effort at inspiration, at the same time continuing the 15 times per minute

rate. This timing can be accomplished only through use of an apparatus the rhythm of which is controlled by hand operation.

When breathing is established, but oxygen is still needed, the face mask with the attached airway should be removed, the continuous flow mask placed over the mouth and nose and the flow meter set at four liters a minute. This procedure applies also in asphyxia when the baby is breathing, but needs oxygen. If oxygen is needed over a period of hours or days, place the tent hood over the head and set the flow meter at four liters. This will give an oxygen concentration of about 70 per cent.

When the asphyxia is of mild or moderate degree, it is not necessary to intubate the trachea. To do so may be difficult; it may even prove harmful. In profound asphyxia, when the larynx is relaxed, tracheal catheterization may be done without the same dangers of injury to the larynx and trachea. Provision is made for the attachment of a tracheal catheter in place of the face mask.

Tracheal catheterization is best achieved by direct vision with a laryngoscope and it should be practiced only by those experienced in the procedure. A special rubber catheter, which cannot be introduced too far and which helps to seal off the larynx, should be used.

Efforts at resuscitation must always be continued without interruption. Often babies will improve in color and heart action, but they may not breathe spontaneously for a long time. Chemical changes have taken place and it is necessary to reverse these changes. Then too, time is necessary for the elimination of drugs which may have been given the mother.

In the absence of suitable apparatus mouth to mouth or mouth to tracheal catheter is the best method. This should be combined with the above principles. The drawbacks in this method are the inaccuracies in judging pressure, the difficulty in keeping a clear airway, the low oxygen content of the expired air of the operator and the danger of infection.

ADULT RESUSCITATION

It is necessary to consider this clinical problem as a separate entity because adult anoxic collapse may occur anywhere and at any time. Therefore it must be stressed that the first person on the scene must initiate manual artificial respiration at once. Thus, widespread training in method is needed.

There are many faults with the manual methods of artificial respiration.[14,15] The aeration of the lungs, even in the hands of experienced operators, is often ineffectual and certainly variable. It is, however, necessary to learn the manual methods and to learn them well; for these methods are difficult to perform and they are very tiring.

The outstanding essential in adult resuscitation is effective pulmonary ventilation and in hospital practice this can be accomplished by inflating the lungs with oxygen, using an anesthetic machine. However, one must be familiar with the machine and he must make sure that excessive amounts of carbon dioxide are not built up.

Effective pulmonary ventilation can be accomplished by the use of an adult resuscitator that is similar to the infant one, but capable of delivering pressures up to 25 mm. of mercury. The pressure required to inflate the adult lung is seldom in excess of 20 mm. of mercury.

Since manual methods are frequently difficult and unsatisfactory, or even impossible to perform in the presence of chest and back injuries and in many other instances, and because it is usually not possible to have a large hospital type resuscitator at hand, it is imperative to have a device so simple that anyone can be trained to use it in a few minutes.

Now, for the first time, we have a resuscitator that is simple in construction and easy to operate.[16] It is portable, can be stored in a small space, since it is five and three-quarter inches in diameter, four inches in height, and weighs less than two pounds. Because the device is simple and portable, routine drills can be carried out to insure the availability of large numbers of trained and competent operators.

Because of these features it can be made available wherever there are undue hazards that may cause respiratory failure.

The apparatus consists of an expansible bellows type bag of 1,500 c. c. capacity, a face mask, and a valve placed between them. There are valves for the intake of air and oxygen and a

safety valve which limits pressure to 20 mm. of mercury.

This resuscitator may be operated with either air or oxygen. Inflation of the lungs may be started immediately with air and, if necessary, oxygen can be added when available without interrupting the procedure. In the absence of obstruction, an effective and satisfactory respiratory exchange may be initiated and maintained. Resuscitation is, therefore, placed on a simple and effective basis.

When the apparatus is at rest, there is free communication between the patient's lungs and the outside air and communication between the patient's lungs and the bag is automatically shut off. When the bag is raised, by placing the hand in the handle at the top of the bag and lifting it, the bellows fills with air through an intake flap valve. During this operation, as well as when the apparatus is at rest, there is free communication between the patient's lungs and the atmosphere. It is, therefore, possible for the patient to begin breathing freely and of his own accord at any time without interference.

Then by compression of the bellows the intake flap valve is closed, whereupon the main valve is activated, closing the communication between the patient's lungs and the outside air, and establishing a communication between the contents of the bag and the patient's lungs. The air now passes into the lungs at a pressure less than 20 mm. of mercury, the setting on the safety valve. When the pressure of the hand against the bag is released, following inflation, the main valve leading to the bag is immediately closed, and the gases in the lungs are expired directly into the outside air. The lungs deflate because of their own elasticity. A mixture of the gases from the lungs and the air or the oxygen in the bag is impossible. This fact is of the greatest importance because by this method the lungs can be rid of noxious or inert gases in the shortest time and it is impossible to build up carbon dioxide. It is obvious, then, that each new bagful contains pure air, oxygen, or a mixture of the two.

The bellows is operated at the normal respiratory rate of about 15 per minute. When oxygen is used, a tube leading from an oxygen supply is attached to the oxygen inlet tube on the apparatus, and a flow of 5 to 6 liters per minute is introduced. This would give between 50 and 60 per cent of oxygen if 500 c. c. (normal tidal volume) is used for each inflation. It is necessary to inflate the lungs only to a point where the chest is seen to rise. It is neither necessary nor desirable to empty the bag completely.

When the patient, who has been apneic, begins to breathe, the initial respiratory efforts are usually irregular and feeble; and the patient does not take in sufficient air or oxygen. When this occurs, with each effort at inspiration the bag is compressed, at the same time continuing the regular rate of about 15 times per minute. When regular breathing has been established, the resuscitator is removed.

By using an elbow* which is supplied with the apparatus the operator may combine the use of this resuscitator with the prone pressure method of artificial respiration and thereby greatly increase its effectiveness. This requires the presence of two operators working rhythmically. It may be the best method following immersion when drainage of fluid is desired. If possible the patient should be placed in a 15 to 20 degree angle with the head down.

Following each manual compression of the chest, the lungs should be inflated with the resuscitator. A definite rhythm should be maintained and the rate should be 15 per minute.

The mouth and pharynx should be kept clear of all foreign material. A clear unobstructed airway is essential for the successful performance of any method of artificial respiration. It should be further stressed that lung ventilation is the ultimate essential in resuscitation; it must be initiated at the earliest possible instant and must not be interrupted for any other form of supportive care.

(1) An apparatus has been described which fulfills all the requirements for the successful treatment of asphyxia in the newborn.

These requirements are: maintenance of body temperature, correct posture for sustaining a clear airway, efficient aspiration and the supplying of

*Designed by Dr. Frederick Fink, Major, Medical Corps, Army of the United States.

oxygen to the lungs intermittently under positive pressure or continuously at atmospheric pressure.

(2) An adult resuscitator for hospital use has been mentioned which embodies the principles of the infant resuscitator.

(3) A new apparatus for performing artificial respiration in the adult has been described. This apparatus meets the requirements for satisfactory and safe inflation of the lungs, using a simple technic. It is small, light, inexpensive and mechanically simple.

(4) Both apparatus operate to inflate the lungs at safe, controllable pressure.

(5) Normal respiratory exchange with atmospheric air can take place while the apparatus is applied.

(6) When breathing begins, the patient is always in free communication with either air or oxygen.

(7) The rhythm and rate are controlled by the operator. This is of utmost importance because the patient's efforts at breathing can be reinforced by the operator and the patient is not compelled to breathe against a rhythm which is not attuned to his own.

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DISCUSSION (*Abstract*)

Dr. W. F. Neun, St. Louis, Mo.—The serious and rapid consequences of asphyxia in the newborn are deeply appreciated by anyone doing a volume of obstetrics. One should not become panicky when the newborn does not breathe immediately after birth, but effective and systematic measures should be instituted to stimulate breathing as quickly as possible. The use of the older methods of resuscitating the newborn have always appeared crude and worthless to me, although I must admit being guilty of using them in my earlier days.

As pointed out by Dr. Kreiselman, when one realizes that one infant dies every four minutes somewhere in these United States, at some time in its first twenty-four hours of life, and that asphyxia is the predominating cause, then the consideration of this subject is of great concern to all of us. The use of many different sedatives and depressants during labor and the very indifferent way in which anesthetics are administered during the second stage of labor no doubt explain no small percentage of these fatalities. Very few hospitals in St. Louis have trained and experienced anesthetists in the delivery room. Very frequently whoever happens to be available is asked to give the patient some gas, no thought being given to the effect on the fetus.

In asphyxia of the newborn, the lungs are in a state of atelectasis and unless we can get the lungs to expand, no air can be gotten into them.

Forced artificial respiration as is obtained with Dr. Kreiselman's respirator must be instituted, and at the same time measures must be taken to overcome the depression of the respiratory center caused by the anesthetic or sedatives given the mother. The use of the respiratory stimulants alone is not enough, because the brain tissue may suffer irreparable damage before breathing is started.

The use of carbon dioxide as a respiratory stimulant in these cases seems useless because there is generally an excess of it in the infant's body already.

The essentials of treatment of asphyxia neonatorum as outlined by Dr. Kreiselman are simple, rational, and seemingly the only successful way of coping with the situation. Every measure must be taken to clear the respiratory tract of any possible obstruction along with getting sufficient oxygen into the lungs to inflate them without damaging the alveolar tissue and also the body temperature must be maintained to prevent shock.

I am unfamiliar with either of the two resuscitating appliances described by Dr. Kreiselman, but from his description of both, they appear to fulfill all requirements for resuscitation. The device for use in the operating room is especially quite simple.

Dr. L. C. Northrup, Tulsa, Okla.—I should like to ask if this second device has been used on the babies. The

first one is a little complicated for the student nurses who have to do the resuscitation in most of the hospitals, but that second one looks as if it could be used on babies if of the proper size.

Dr. John Adriani, New Orleans, La.—The bellows device is still not available for civilian use. The entire production, I am told, is going for military purposes. However, I was fortunate enough to be given one. The device is very simple. It takes but a few minutes to teach an intern or a nurse or a medical student how to use it and it works very effectively.

The apparatus is not suitable for infant resuscitation. The device is designed primarily for adults. The mask and all the adjustments on it are for adult use.

I do not know exactly what Dr. Kreiselman has in mind, but it appears to me from material that he has in the earlier part of the paper that there is no difference between adult and infant resuscitation. Anyone who has done both knows that. There appears to me to be no reason why an apparatus of this kind could not be devised for infant use. Perhaps Dr. Kreiselman has that in mind.

THE RESULTS OF SURGICAL TREATMENT IN ONE HUNDRED CASES OF CHRONIC MENTAL ILLNESS*

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In follow-up studies of large numbers of institutionalized mental patients it was found that even with the most advanced methods of treatment approximately 58 per cent became chronic and required permanent institutional care.[1] Recently, bilateral prefrontal leukotomy, a surgical method, has proved to be effective in cases of mental illness.[2] It was desirable, therefore, to evaluate the effectiveness of such a procedure in the chronic mentally ill, especially in the chronic schizophrenic.

The surgical treatment of mental illness is the outgrowth of clinical observation and of recent experimental work both in Europe and the United States.

At the Second International Neurological Congress in London, 1935, attention was called to the relation of the frontal lobes to emotional changes by two workers. In a patient with brain tumor, Brickner[3] reported the remarkable lack of concern after partial removal of both frontal lobes. A similar result of prefrontal lobectomy upon the abnormal behavior of a chimpanzee was presented by Jacobsen[4] at the same meeting. These experiences prompted Moniz and Lima,[5] both from Portugal, to attempt frontal lobe surgery in chronic mental illness. Their procedure was introduced and modified by Freeman and Watts[6] in this country. Variations of approach[7] and of extensiveness[8,9] of surgery were reported since by various authors.

The operation consists in sectioning the white matter within the prefrontal lobes in the plane of the coronal suture. From a single burr hole on each lateral aspect of the skull, 3 cm. posterior to the lateral rim of the orbit and 5 cm. above the zygomatic process, a blunt dissector is introduced to a depth of 5 cm. and the white fiber mass is divided transversely just anterior to the tip of the ventricle, either throughout or in the lower (orbital) quadrants alone.[9]

It is assumed by some that the sectioning of the fibers connecting the frontal lobes with the thalamus may be responsible for the postoperative lessening of the excessive emotional response in the psychotic.[6]

This paper is a clinical report of the results obtained with bilateral prefrontal leukotomy in the first 100 institutionalized patients operated upon at the St. Louis City Sanitarium since 1941. All of the patients were carefully studied psychologically and observed clinically for at least one year, 37 of them more than two, 10 more than three years. This series of 100 cases represents patients who have been ill for an average of 10 years and have been hospitalized for an average of 5 years. Many of these showed not only social maladjustment but definite antisocial behavior on a noisy, combative and destructive level, often with suicidal or homicidal tendencies. They had received many other types of therapy. The number of shock treatments alone given this series was 2700 and included

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metrazol, nitrogen, insulin and electric shock. All these therapies had failed to influence the course of the psychosis and surgery was considered as the last resort. In 65 of the patients all four quadrants were cut. In 35 patients leukotomy was limited to the lower (orbital) quadrants exclusively, with no statistical difference in therapeutic effect.

In estimating the results of the surgical procedure, three categories of change in behavior were evolved. The first, much improved, consists of those who returned to their former occupational and social levels; the second, improved, consists of those who returned to a limited social and occupational level; the third consists of both those unimproved and those only slightly improved and requiring less nursing care. It is our opinion that not any of them have become more psychotic.

The various diagnostic categories and the surgical results are outlined in *Table 1*:

66 cases are in the schizophrenic group, 16 cases in the manic-depressive group, 6 cases in the psychoneurotic group and 12 cases compose other types of mental illness. Of the total series of one hundred, 33 per cent are much improved, 34 per cent were improved, and 31 per cent show little or no improvement. Two cases died as the result of the operative procedure.

Considering the various categories separately, there are in the schizophrenic group 27 per cent much improved, 36 per cent improved and 30 per cent slightly or not improved. The results differ, however, in the various schizophrenic subtypes: Much improved are 15 per cent of the hebephrenics, 25 per cent of the catatonics, 33 per cent of the paranoid schizophrenics and 50 per cent of the paranoid states. Improved are 40, 50, 25 and 33 per cent respectively. (*Table 2*). The hebephrenic becomes more extroverted, interested and active; the catatonic loses his impulsiveness and negativism; the paranoid loses his intense interest in his delusions and hallucinations. The outlok in the paranoid group in general appears much more favorable than anticipated. The paranoid states are included here because of their close relationship to this group.

In the manic-depressive group there are 56 per cent much improved, 25 per cent improved, and 19 per cent slightly or not improved. In this group we have included the manic phase, the depressed phase, the agitated depressions and the involutional melancholias.

In the psychoneurotics, including long standing obsessive compulsives, we find 83 per cent much improved and 17 per cent improved. This group is small, but all of the patients show improvement. There is none that we consider only slightly or not improved.

The fourth or the last of the groups of diagnostic categories consists of twelve patients: 6 epileptics, 4 chronic encephalitics, 1 drug addict and 1 mental defective with psychosis. Three epileptics who were sullen, irritable, noisy and violent are now improved, helpful and cooperative on the ward; though there is still some increased irritability before the onset of their

RESULTS OF BILATERAL PREFRONTAL LEUKOTOMY IN VARIOUS TYPES OF CHRONIC MENTAL ILLNESS.

Types	No. of Cases	Much Improved	Improved	Slightly Improved	Not Improved	Dead
Schizophrenia	66	18	24	20	2	2
Manic-depressive	16	9	4	3		
Psychoneurosis	6	5	1			
Other types	12	1	5	4	2	
Total	100	33	34	27	4	2

Table 1

RESULTS OF BILATERAL PREFRONTAL LEUKOTOMY IN TYPES OF SCHIZOPHRENIA.

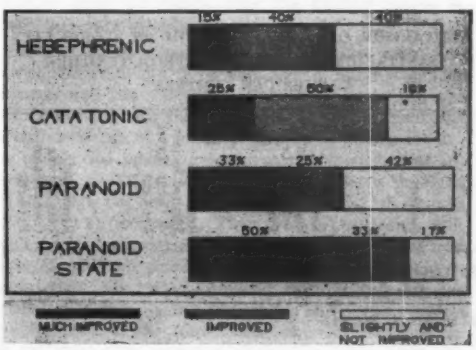

Table 2

menses or their epileptic seizures. The other three are slightly improved in that they require less hydrotherapy and less nursing care. The operation does not influence the frequency of the seizures. Out of the four post-encephalitics one was improved, one slightly improved and two not improved. One drug addict was much improved, one mental defective with psychosis was improved and re-socialized.

Comparing the results in the first 100 patients at our institution with the results obtained in a survey[10] of 582 patients in 17 other centers, we find (*Table 3*), that the percentages lie close together; we report 33 per cent much improved, 34 per cent improved, 31 per cent slightly or not improved, which compares favorably with their respective figures of 31, 33 and 30 per cent.

The postoperative course in all of the patients followed a well defined sequence which readily falls into two phases. The first phase consists of the immediate effects of the trauma to the brain. There may be transitory incontinence, neurological signs such as an occasional Babinski sign, unequal pupils and facial asymmetry. These all subside within the first few days. There also appears a slowing down of speech, thought and activity. The patients lack interest, initiative and spontaneity. Confusion is seen in only a very few patients although there is frequently considerable difficulty in time appreciation. The patients' psychotic behavior may persist to some extent; however, there is always marked lessening of tension and anxiety with relaxation and unconcern to the extent of indifference. This may last only a few days or extend over a few weeks.

COMPARISON OF RESULTS AT THE ST. LOUIS CITY SANITARIUM WITH RESULTS FROM 17 OTHER AMERICAN CENTERS.

Centers	Return to Former Social + Occup. Level Per Cent	Return to Limited Social + Occup. Level Per Cent	Requiring Less Nursing Care or Same Per Cent
St. Louis City San. 100 cases	33	34	31
17 centers (L. Ziegler) 582 cases	31	33	30

Table 3

The second phase appears as the more acute symptoms gradually subside. The convalescing and recovering patient shows increasing interest in his surroundings, begins to test and approach reality often with little restraint, invariably without his former intensity, shows evidence of being pleased with his new experiences and is undisturbed by delusions or hallucinations. The patient first begins by following orders, then he starts to initiate his own activities and gradually enters into activities with others. He becomes sociable and affable, wants to work, resumes former avocations and participates in new hobbies. He enjoys eating and his gain in weight is often pronounced. The excessive personality trends are now only faintly suggested and a warm sense of humor becomes apparent. The intellectual assets were not diminished. During this period it is essential that he have sympathetic guidance and direction. This we achieve by having him on special wards with supervision by medical, nursing and occupational therapy personnel.

Thirty of the patients were discharged from the institution after an average of five months postoperatively. A study of the post-parole status of the patients reveals that fourteen are regularly employed, four of them for the first time in their lives; twelve are housekeeping and carry the full burden of their responsibilities; four others are more or less helpful within the family group.

The favorable results of bilateral prefrontal leukotomy within the last three and one-half years at the St. Louis City Sanitarium, in our opinion, justify the use of this procedure in the chronic mentally ill. The outlook for the one hundred operated patients as to remission or recovery was nil and any postoperative change in behavior should be regarded as the result of bilateral prefrontal leukotomy. No recovery occurred after skin incision alone, exploratory craniotomy or unilateral subcortical transection. Most of the patients who were discharged are indistinguishable from other normal individuals and have resumed their social and economic responsibilities.

Our results in the affective reactions and in the psychoneurotics corroborate those published by others.[2] The effectiveness of the operation in schizophrenics is demonstrated in the series

of sixty-six patients reported here. An analysis of the subtypes (*Table 2*) indicates that the poorest prognosis is in the hebephrenic and the best in the paranoid state.

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KIDNEY COLIC SIMULATED BY TRAUMATIC DISSECTING ANEURISM OF THE ABDOMINAL AORTA*

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Renal colic simulated by aneurism of the abdominal aorta is a condition rarely seen in private urologic practice. The occasional aneurism that is seen is usually of the spontaneous type (due to syphilis or atherosclerosis) rather than traumatic in origin.

The pain may be very similar to that of renal colic, is rather sudden in onset and appears to occur at the time of rupture of the aneurism. The pain continues as bleeding in retroperitoneal tissues progresses and is remarkable in that opiates offer little relief. Although the pain may not be quite so severe as some cases of renal colic due to stone, the pain is none the less quite intense. Other urologic conditions besides a renal calculus which can be simulated by a ruptured abdominal aortic aneurism are said to be perinephritic abscess, kidney tumor or hydronephrosis.[1] The urologic condition imitated will depend on the predominant presenting symptoms as produced by the increasing size of the mass or changes produced in the kidney or its position as a result of extrinsic pressure. The occurrence of transient microscopic or macroscopic hematuria with albumin and other cellular elements is not uncommon in any abdominal aortic aneurism and is due to the production of a vascular disturbance within the kidney. Uremia may occur as a result of pressure on the renal arteries.

Associated with the urologic symptoms there may be other prominent symptoms such as abdominal pain or various gastro-intestinal disturbances. Moreover the gradual development of a secondary anemia or unexplained hypertension are often prominent features and will assist in making a differential diagnosis. In any event if there is any question as to the diagnosis retrograde pyelography is indicated.

CASE REPORT

A 27-year-old soldier was admitted to the hospital three weeks after being wounded by an enemy sniper bullet. The patient said that when he was hit he felt as if he had been cut in half and was afraid to look at his legs for fear that they were gone. He was unable to move his lower extremities. The soldier thought he had been struck by a wooden bullet inasmuch as no metal missile had ever been removed or shown on any x-ray. Voiding was quite difficult and the patient exerted much pressure using his hands over the bladder region in order to empty his bladder.

On physical examination the site of bullet entry was located between the third and fourth lumbar spinous processes and just slightly to the right. The wound was well healed and was 1 cm. in diameter. The patient had definite evidence of a lesion of the cauda equina involving mainly the lumbar group from 12 down to and including all of the sacral nerves. There was a paralysis of both legs but little atrophy inasmuch as the injury was of recent occurrence. There was hyperesthesia over the soles and dorsum of both feet and the patient had some spontaneous pains in them as is very frequent in paraplegias. The rectal sphincter was relaxed and the patient sometimes soiled the bed. There was marked hyperesthesia of the testes bilaterally, slightly more so on the right side. Physical examination was otherwise essentially negative.

The day after the patient's admission to the hospital,

*Received for publication April 30, 1945.

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he had a sudden severe pain in his right kidney region. The pain radiated anteriorly into the right flank and groin. There was no radiation into the genitalia or into the thigh. The patient said that the pain was aggravated by lying on the right side and relieved by lying on his back or left side. On examination there was right costovertebral tenderness and also some tenderness in the right side of his abdomen. An x-ray was taken which was negative for renal calculus. The kidney shadows and psoas muscle was obscured because of considerable gas formation throughout the entire intestine and particularly over the right kidney region. There was no evidence, however, of a solid mass. Morphine sulfate was given hypodermically but the patient complained considerably. A few days after the occurrence of pain, the patient passed some blood in the urine and he frequently stated afterward that it was dark in color. On the tenth day of hospitalization the patient began to show signs of hemorrhage and his blood picture was that of a secondary anemia. A diagnosis was made of a dissecting aneurism of the abdominal aorta and the abdomen was explored. At operation a large pulsating retroperitoneal mass was found. It was not possible to ligate the aorta below the renal arteries. The patient was given supportive therapy but died 11 days after operation.

SUMMARY

(1) A patient with a spinal cord injury due to a bullet wound developed a dissecting abdominal aortic aneurism which simulated renal colic. In this particular case the colic was on the right side.

(2) The imitation of renal disease by abdominal aortic aneurisms is considered. The diagnosis of abdominal aortic aneurism, never easy, was rendered more complex here because of the associated paraplegia.

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SOME EXPERIENCE WITH SMALL DOSAGE DUST AND POLLEN THERAPY*

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House dust as a cause of respiratory allergy was first reported by Cooke[1] in 1918. In 1921 Vander Veer[2] reported that positive skin reactions were elicited in 25 per cent of these cases. About this time Kern[3] also emphasized that house dust is an important cause of bronchial asthma.

The frequency of positive skin reactions to house dust varies from 25 to 96 per cent among different observers. These variations may be accounted for, however, upon the basis of differences in technic, test extracts and the interpretation of the reactions. Dust extracts are usually irritating to the skin, especially in dilutions of 1-10 or stronger. Walzer[4,5] states that no reaction, for which reagins cannot be demonstrated by the indirect or passive transfer method of testing, can be considered authentic, regardless of its size.

House dust contains many known allergens to which the patient may be sensitive. Davidson[6] has recently reported that the chief constituents consist of cotton, flax, jute, wool, silk, six or more animal hairs, three or more feathers, glue, kapok, orris root, pyrethrum and tobacco. It has been pointed out by Cooke[7] and later by Hampton and Stull[8] that house dust also contains an unknown or specific allergen. Cohen, Nelson and Reinarz[9] demonstrated that the house dust allergen develops in cotton linters, also in feathers and kapok as the result of an aging process. Cohen found more active dust allergens in bedding and overstuffed furniture than in other household articles. Later Cohen[10] and his co-workers presented further evidence that house dust contains a specific antigen. More recently Cazort[11] has expressed the opinion that the house dust antigen is specific, resulting from the deterioration of cotton, kapok and possibly other cellulose materials.

In view of the fact that there is no standardized technic and no plan of selection of the materials for the preparation of house dust extracts, there must be a very significant variation in the skin reactability, effectiveness, dosage and consequently the results obtained in treatment. Some allergists use autogenous, stock, commercial or a combination of one or more extracts. At different times we have used all three. Since 1938 we have used almost entirely our own prepared stock extract. A fresh extract is made about once a year and 50 per cent glycerine included for preservation. When fresh

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preparations are made the same materials are used each time in approximately the same proportions. Fresh dilutions are made about every two or three weeks. By employing the same extract over a long period of time, it has been easier to interpret skin reactions, effectiveness and dosage.

On the basis of what we know about house dust and its constituents, we have prepared stock extracts with the following ingerdients. Parts of a number of vacuum cleaner sweepings, old mattress stuffing, automobile upholstery vacuum collections, kapok, feathers, jute and ozite. Specific animal hairs, silk, pyrethrum, tobacco or specific environmental dusts were added separately when indicated. In some instances an extract of old feed mill dust which consists almost entirely of molds, such as that reported by Wittich[12 13] was used either alone or added to the stock dust extract.

Skin reactions to the stock extracts were quite consistent. The 1-10 extract was the strongest employed in testing. Some irritating reaction was often noted with this dilution and taken into consideration. Previous to 1938 we believed that the skin reaction was a fairly reliable index of sensitivity but since then we have considered the severity of symptoms as a more reliable indication of relative sensitivity. At the same time small or large skin reactions were also given consideration (*Chart 1*).

In starting treatment we formerly began with that dilution which just failed to give a skin reaction. In most instances this was a 1-100 solution. The dose was gradually increased to varying amounts of the concentrated extract. With this method of treatment some good results were obtained but there were too many patients who had no response whatsoever. Then it was decided that the weaker dilutions might be more effective. The idea was based upon some previous experience with small subcutaneous and intracutaneous treatments for hay fever, as previously advocated by Vaughan,[14] Anderson[15 16] and others.

The plan of administering small doses of dust extract was begun in 1938.[17 18] At that time treatment was started with the 1-1000 and 1-10,000 dilutions depending upon the skin reactions. Dosages were gradually increased by 0.05 c. c. until a maximum of tolerance was reached. In some instances it was noted that satisfactory relief occurred after a few initial injections and that further increase resulted in an increase of symptoms. As the result of this experience the plan was adopted by which no increase in dosage was made when satisfactory relief was noted. If injections had been given once a week, an attempt was made to gradually to increase the intervals to 10, 14, or 21 days. Sometimes it was necessary to increase slightly the dose which gave one-week relief in order to obtain a longer period. In this manner an optimum effective dosage was determined. In some instances treatment was discontinued after satisfactory relief was obtained. Many patients were free of symptoms for long periods of time before the injections had to be repeated. In the meantime experiments are being conducted to determine whether it is advisable in some instances to give

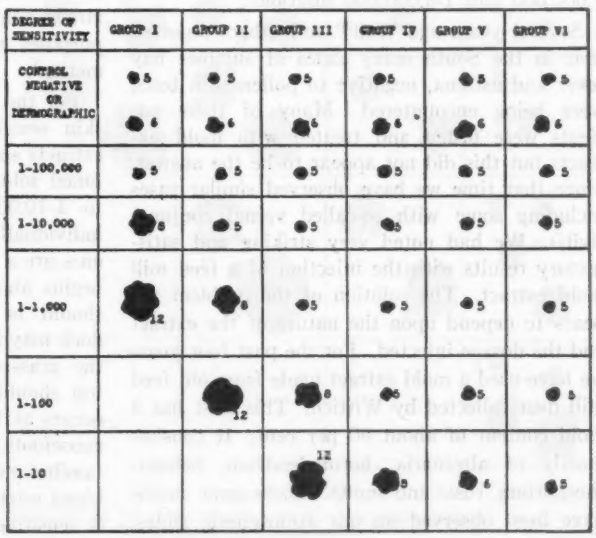

Chart 1
TITRATION OF DUST SENSITIVITY

a series of injections with alternating periods of rest.

During the past three years it has been observed that optimum dosage varies from the 1-10,000,000 to the 1-10,000 dilutions. In the most severe cases treatment has been started with the 1-10,000,000 dilution. In cases of lesser severity the 1-1,000,000 has been used for initial doses and in the moderate and mild reacting cases the 100,000 and 10,000 dilutions were found to be satisfactory. More success has been noted by calculating dosage on the basis of the severity of symptoms and complications than on the basis of the skin reaction. Even in severe cases with negative skin reactions the smallest doses were used with effectiveness. In children the 1-10,000,000 and 1-1,000,000 dilutions were found to be satisfactory.

The scale of dosages outlined above would have to be modified according to the potency of the extracts used by any individual observed. We are indeed very much in need of standardized extracts, in order to standardize dosage. In a recent issue of the International Correspondence Club letters, Swineford[19] reports his method of preparing dust extracts by the acetone precipitation method. He noted the occurrence of systemic reactions following the injection of 1-5,000,000 and 1-8,000,000 dilutions.

Several years ago Weil[20] and others reported that in the South many cases of summer hay fever and asthma, negative to pollen skin tests, were being encountered. Many of these patients were tested and treated with mold extracts but this did not appear to be the answer. Since that time we have observed similar cases including some with so-called vernal conjunctivitis. We had noted very striking and satisfactory results with the injection of a feed mill mold extract. The solution of the problem appears to depend upon the nature of the extract and the dosage injected. For the past four years we have used a mold extract made from old feed mill dust collected by Wittich. This dust has a mold content of about 90 per cent. It consists mostly of alternaria, hormodendrum, helminthosporium, rusts and smuts. These same molds have been observed on our atmospheric slides. They represent thousands of species which could not be reproduced artificially by individual cultures. Like house dust, it produces an ideal mixture. It is extracted and used for testing and treatment as in the case of other dusts. Upon comparative skin testing with house dust, it was found to be about ten times stronger. It should be used therefore in dilutions ten times weaker than stock dust. When mixed with stock dust it should be added to represent a ten per cent mixture.

The mold extract may be employed as such or incorporated into the stock dust according to the requirements in individual cases. In certain specific instances the mildews appear to be a factor. This material may be collected directly from the household or the vegetation as suggested by Rinkel.[21] For the present time this plan of management of the mold problem appears to offer the most satisfactory solution.

DIAGNOSIS AND TREATMENT OF HAY FEVER

In the diagnosis of hay fever the skin tests to pollen extracts are very reliable. The occurrence of hay fever in the absence of positive skin reactions is very rare. On the other hand, false positive reactions may occasionally be noted in the absence of hay fever. In the final diagnosis the skin reactions should be correlated with the time of appearance of the symptoms, the atmospheric counts and field surveys. A larger number is not necessary. For diagnostic purposes we routinely use the cut or scratch method.

For the purpose of determining the degree of skin sensitivity and for treatment the pollen extracts should be made into individual or combined solutions of various dilutions from 1-100 to 1-10,000,000. The extracts may be used individually or combined, according to which ones are a factor. For the grass hay fever which begins about May 15, June and orchard grass should be used in equal parts. Plantain or dock may be used individually or combined with the grasses. After June 15, timothy and red top should be used for grass hay fever which occurs at this time. For the ragweeds and the goosefoots, combined extracts of these two families may be used as individual or as combined mixtures according to whether the patient is sensitive to ragweeds or goosefoots, or both. If necessary, grass extracts of those which pollinate at this time may be added.

With patients who do not receive satisfactory results from preseasonal subcutaneous injection therapy after the season begins, the intracutaneous method may be used and the subcutaneous injections discontinued. Intracutaneous treatment may also be found to be most satisfactory with patients who have had incomplete preseasonal therapy. Whenever possible the coseasonal type of therapy should be preceded by a series of about ten injections, either intracutaneously or subcutaneously, before the onset of the season.

During the past six years we have employed the coseasonal method of treatment in practically all the tree and grass cases and in about one-half of the ragweed cases with most satisfactory results.[22] Most of the patients had ragweed hay fever; many of these did not report for treatment until after the season had started. Some patients were treated by the intracutaneous method for six or more consecutive years.

Before the initial dosage is given, the skin sensitivity is determined by intracutaneous tests with 0.01-0.02 c. c. of the various dilutions ranging from 1-10,000,000 to 1-1,000 (see *Chart 2*). Occasionally the 1-100,000,000 or the 1-100 dilutions are necessary. Initial testing is always made with the 1-10,000,000, 1-1,000,000 and the 1-100,000 dilutions using coca solution as a control. If a positive whealing reaction as large as 15 mm. in diameter is noted to the 1-100,000 dilution, no further tests are made at the initial sitting. Within one or two days, treatment should be started with 0.02 c. c. of the 1-100,000 dilution, which usually produces a wheal about 15 to 18 mm. in diameter. Subsequent doses should be administered every two to five days or longer, according to the degree of relief obtained. The amount of the injections should be increased by 0.01 c. c. The size of the wheal increases with each subsequent dosage by about 1 to 2 mm. The average size wheal which produces satisfactory relief varies from 18 to 22 mm. in diameter. Occasionally it may be necessary to increase it from 25 to 30 mm. in diameter. In order to reach optimum dosage, as much as 0.05 c. c. of the 1-10,000 dilution may be necessary in cases of moderately marked sensitivity. After a few treatments at two- to three-day intervals it is often possible to increase the intervals from five to seven days in ragweed cases. In the tree and grass cases longer intervals are often possible because of the marked variations in pollen concentration. In some of the grass cases, intervals of two weeks or longer are possible.

With each subsequent treatment there is a

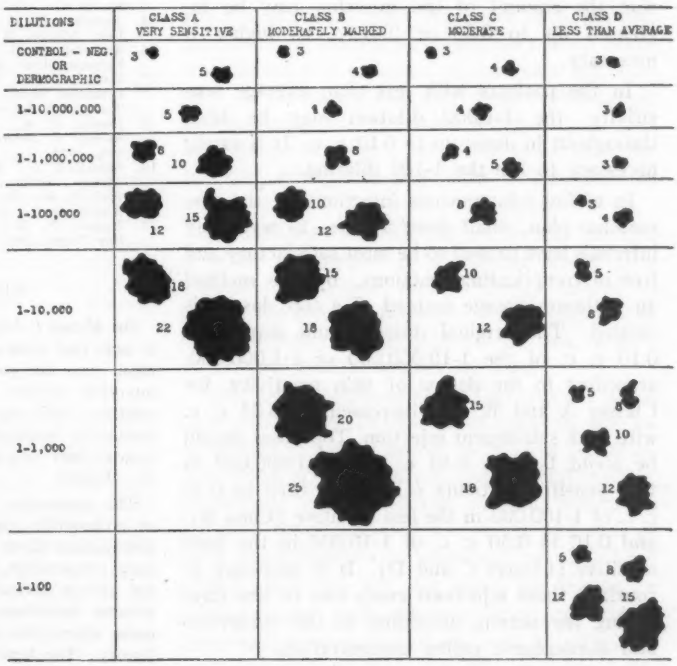

Chart 2

TREATMENT OF HAY FEVER. TREES, GRASSES, WEEDS. TITRATION OF SENSITIVITY.

Diameter of wheals in millimeters. Always test first with 1-10,000,000, 1-1,000,000 and 1-100,000 dilutions; then add 1-100,000 and 1-1,000 according to sensitivity.

tendency to reduction of the skin reaction in proportion to the dosage injected.

By this method of treatment the size of the skin reaction, the degree of relief and the intervals between injections indicate the optimum dosage.

In the cases of moderately marked sensitivity a wheal about 15 mm. in diameter is the rule with 0.01 c. c. of the 1-10,000 solution. The 1-1,000 should not be applied at the first sitting. Treatment should be continued with increasing doses of 0.02, 0.03, 0.04, and 0.05 c. c., and then with 0.01, 0.02, 0.03, 0.04 and 0.05 c. c. of the 1-1,000 dilution according to the plan outlined above. Satisfactory response is usually noted to wheals varying from 18 to 22 mm. in diameter.

In patients with moderate sensitivity, a wheal about 15 mm. in diameter is usually obtained with the 1-1,000 dilution. Subsequent injections should be increased by 0.01 c. c. until the proper size wheal is obtained. With the 1-1,000 dilution the amount of the injection may be increased up to 0.05 or 0.07 c. c., higher if necessary.

In the patients with less than average sensitivity, the 1-1,000 dilution may be used throughout in doses up to 0.10 c. c. It is rarely necessary to use the 1-100 dilution.

In giving subcutaneous injections by the preseasonal plan, small doses at five- to seven-day intervals have proved to be most satisfactory and free of complicating reactions. By this method an optimum dosage instead of a top dosage is desired. The original doses should start with 0.10 c. c. of the 1-10,000,000 or 1-1,000,000, according to the degree of skin reactivity, for Classes A and B, and increased by 0.05 c. c. with each subsequent injection. Top doses should be about 0.10 to 0.30 c. c. of 1-1,000,000 in very sensitive patients (Class A), 0.10 to 0.30 c. c. of 1-100,000 in the less sensitive (Class B), and 0.10 to 0.30 c. c. of 1-10,000 in the least sensitive (Classes C and D). It is necessary to continue these injections every two to five days during the season, according to the symptoms and atmospheric pollen concentration.

For the most satisfactory results in hay fever treatment, complete skin testing should be performed and particular attention must be directed to the control of complicating sensitivities or manifestations such as those resulting from dust, molds and foods.

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DISCUSSION (*Abstract*)

Dr. Mason I. Lowance, Atlanta, Ga.—It is encouraging to note that most of the younger men and a few of the older men, due partly to Dr. Hansel's aggression, now interview patients about acute nasal congestions before treating. Still, most pollen and dust sensitive cases are treated by intranasal methods for one or two years and then of their own accord make their diagnosis and go to an allergist.

The appearance of the mucous membrane, presence of eosinophils, and particularly the histories, usually differentiate these patients from infectious cases which have temperature, aching and many other things that the allergic patient has not. The family history is of extreme importance in the recurring nasal congestion cases, where there is little to be gained from the patient's history. The hereditary allergic individual is the most prominent patient seen in doctors' offices.

I agree with Dr. Hansel's previous statement that nasal operative work should be preceded by allergic investigation, and that the allergic condition should be corrected as far as possible before operative work is

done. Dr. Unger, in his paper today, commented on the necessity for conservative operative work on the allergic nose.

In 1940, Dr. Hansel covered in his article, "The Treatment of Allergy of the Nose and Paranasal Sinuses by Hyposensitization with Dust Extracts," the various studies of dust, modes of testing, potency, and so on. There can never be a single standard house dust and this is emphasized by the "Endo" dust producers in that they label each batch of dust extract and alter their schedule if a given patient is treated from more than one batch. There could never be a common factor in house dust since dust can only contain products found at the site of collection. If a patient is sensitive to house dust and one wishes to do so, he can usually pick out the specific factor in dust to which that patient is sensitive by going to the home and studying the home and its content. This was exemplified in a patient who was not sensitive to molds as they are kept for testing and was only moderately sensitive to stock house dust, but very sensitive to autogenous house dust. On investigation of his bedroom and adjacent closed in porch there was found to be an extremely moldy odor and on selecting the dust from the house for testing, it was found that the mold dust was the one giving him the most extreme reaction. When he changed his sleeping room very little treatment was necessary before his allergic condition cleared completely. (He was tested to a dust from his bedroom and adjacent porch as compared to the dust from the balance of the house and was much more sensitive to this dust containing the molds than to the other dust.) Another patient, a doctor's wife, has so much asthmatic disturbance at her house at night that she cannot remain at home, but gets along nicely elsewhere. Epinephrine hypodermically is required when she remains at home. Here, she is sensitive to stock house dust slightly, moderately to her usual vacuum cleaner dust from home, and extremely to dust from the basement and part of the house giving the moldy odor. At the same time she is not sensitive to stock mold extracts. She has improved promptly by some small doses of these extracts and long before a dose would be reached that would give any local reaction.

One other quotation from Dr. Hansel is in order: "Regardless of skin reactions, the patient should be treated for dust sensitivity if the clinical history indicates it." There is no new information on the preparation of the extract, on the frequency of doses, or on the size of the dose. The important thing is to start with the dose low enough that there is no reaction and to build up gradually by increases of 1/20 c. c. or less per dose until you reach the dose that begins to give slight swelling at the site of injection. Dr. Hansel stops increasing the dose when he reaches the point where the patient is showing clinical improvement and does not go on to the point of giving slight local swelling. I agree with this in that the patient gets the same result this way as he gets if he is carried up just to the point of producing a slight local reaction. If the dose is carried high enough to give a large reaction one frequently begins to get a poor result again where he was previously getting a good result. In Dr. Graham's presentation this morning he referred to Dr. Vaughn's comment on the small co-seasonal doses of extracts rather than large doses.

Question.—I just want to ask if Dr. Hansel makes routine smears in each case, nasal smears?

Dr. Hansel.—Yes, I make nasal smears routinely.

THE RELATIONSHIP OF RADIOLOGIST TO PRACTICING PHYSICIAN*

By R. T. WILSON, M.D., F.A.C.R.
Austin, Texas

In the light of recent governmental tendencies, it seems appropriate that we as physicians should stop, look, and listen. We should examine our professional conduct and character. Is there anything wrong within that we should become the target of much discussion and the center of much political warfare? Are there unworthy and unwholesome tendencies within our ranks? Have we allowed evil practices to dominate our conduct to the extent that our great philanthropic and humanitarian profession is rightfully subject to public criticism? Are there evils that the political demagogue can solve better than we ourselves?

It sometimes happens that an outsider may get a better perspective of a problem under consideration than one who is closely related to it; yet the outsider probably does not know the cause of many of the ailments nor the remedy in a much greater number of them.

It is not my purpose here to go into our social and political difficulties more than to say we all should be willing openly to face any constructive effort to improve our public relationships, as well as to continue our constant efforts to improve our professional knowledge and skill at such opportunities as meetings of this kind afford; and last but not least, we should be willing to face facts, whatever they are, and to acknowledge our faults, if any, and by all means to give credit where credit is due. In my humble opinion, the wisest counsel and best judgment

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of our leading medical philosophers should be sought and followed. May I say it earnestly and candidly, the concerted action of the entire medical profession and all her friends is none too much to give and may yet prove "too little and too late."

You and I who try faithfully to represent the sciences and arts of healing are thoroughly convinced that the welfare of every man, woman, and child in the nation is at stake in the manner in which our medical profession is treated by our government. To sit idly by and raise no voice in solemn protest against an enemy which would undermine the very foundations of free and competitive practice of this noble profession would be most reprehensible. Besides all this, if this attack against our great profession should gain a foothold, it may prove the opening wedge to greater and more extensive governmental efforts at socialization in other fields of professional and vocational endeavor.

What has all this to do with the subject in hand? Just this: radiologists and practitioners of all branches of medicine are members of one great calling; and as such, they must have one great common purpose: the best possible service to the greatest possible number of people. More than this, the services of radiologists and other practitioners are complementary one to the other ofttimes, and each has a share in the responsibility for the patient's health and welfare. They have had the same fundamental medical courses and passed the same examinations for graduation and license to practice. Here the paths of the practitioners of the various medical specialties deviate slightly and yet coincide at many points. The everyday problems may vary in different special fields; but after all, the physicians in these fields are still fellow practitioners and have their common problems of relationship as members of the same profession. In view of these facts, it behooves us more clearly to understand each other that there may be harmony among us, for discord only serves to weaken our lines of defense and give advantage to politicians who may unwittingly, wantonly, or willfully use it against us. In unity there is strength. Whatever affects one segment of a profession affects all, for the whole is no greater than the sum of its parts, nor the chain stronger than its weakest link. Charity might suggest that we refrain from impugning the motives of our sociologically inclined politicians. It is, nevertheless, quite likely that their ignorance of our profession and our motives disqualifies them from becoming crusaders who, in the guise of public benefactors, succeed in bringing to wreck and ruin a system of medicine unequaled in the world's history, both from the standpoint of its acceptance by a democratic people and its results in the control of disease as shown by the morbidity and mortality records. There is much yet to be desired, but governmental medicine is not the way to higher attainment in these objectives; on the other hand, we candidly believe the opposite is true. A paragraph here from W. James Marquis[1] is appropriate:

"But whatever does take place, one thing is certain; and that is we must be prepared to cooperate with each other to a greater degree than ever before. To many medical men this will be a really difficult problem. We must be alert and prepared to guide whatever changes do occur into the best possible channels for all concerned. This requires consideration of each other's problems so that all may cooperate for the common good, not forgetting the welfare of the patient."

Dickinson[2] believes "a better understanding and cooperation is needed between roentgenologists and men in other branches of medicine" and makes a plea for "closer contact between roentgenologists and their patients."

But to come to closer grips with problems, let us consider some concrete matters with which we as radiologists must deal. To simplify the analysis of these problems, let us state three fundamental postulates:

(1) The practice of radiology is the practice of medicine.

(2) Only physicians who are graduates of reputable medical colleges and duly licensed to practice medicine, and who have had special training in this field, can be properly classified as radiologists.

(3) Aside from certain phases peculiar to this practice, there are no fundamental differences in the relationships here from those in other fields of medicine.

Kirklin[3] has well stated:

"Radiology has been accepted as a special branch of medicine. The right of the radiologist to consider him-

self a specialist and his competence as such are determined by the American Board of Radiology which, with the approval of the American Medical Association through the Council on Medical Education and Hospitals, prescribes stringent requirements for candidates seeking the Board's certificate."

In this connection the late Dr. Pancost[4] adds:

"Probably the most important step ever taken to place radiology upon an appropriate standing is the formation of a Qualifying Board. The proper functioning of such a board almost automatically creates a standard which will tend to become higher as time goes on, just as have been the experiences following the operations of similar boards connected with other specialties."

Trostler[5] remarks, with reference to the legal aspects:

"With few exceptions, radiologists have practically the same legal responsibilities as the practitioner of general medicine, along with the additional and added responsibilities of those of a specialist."

The late Thomas A. Groover[6] is responsible for the following:

"Radiology has one advantage over most other medical specialties in that its scope is the whole field of medicine and surgery.*** Radiology has now reached a point in its development where it is on a sound foundation both as an art and a science. As an art, it has reached a degree of accuracy in technical procedure hardly equalled in other fields of medical practice; as a science, it reaches out into every field of medical knowledge. The pioneering work has been done and the dangers encountered by the pioneers are now past. For those who will properly equip themselves it offers not only an agreeable and interesting career but challenges the best powers they can bring to its practice."

Christie[7] has added:

"Radiology is still a young and rapidly developing art and many changes may be anticipated as time passes. Experience indicates, however, that advances will be along safe lines and progress will be more rapid if the practice of radiology is largely confined to those who are especially prepared for it and who confine their work to this branch. It is broad enough to engage all the talent and energy that any man can bring to it."

Baetzer and Waters state that the roentgenologist has four inseparable friends: the anatomist, pathologist, internist, and surgeon; and Bogart[8] wishes to add a fifth one, the physiologist. He says:

"With them his work rises or falls. The physician and the surgeon should not shed their responsibility and expect the roentgenologist to make the diagnosis for them. The roentgenologist should be considered a highly skilled physician with whom his colleagues cooperate and coordinate as one of the important highways to reach the destination of a workable diagnosis and possible cure, and not the sun around which the medical and surgical diagnosis revolves."

Gosta Forssell[9] has said:

"In medicine, radiology has played the role of a pioneer and a creator in the spheres of diagnostics and of therapy;" he adds, that "roentgen diagnostics have contributed most essentially to the magnificent progress made during the present century in the provinces of abdominal, thoracic, and cerebral surgery, and in orthopedics. As regards internal medicine, too, roentgen diagnostics have become an indispensable guiding star."

Thus it is apparent that on the authority of these and many other distinguished members of our profession, it is established, I believe, that the practice of radiology is the practice of medicine and that only physicians possessing special qualifications can be classified as radiologists.

This brings us then to our third postulate, namely: there are no fundamental differences in relationships here from those of other fields of medicine. Our attention is focused directly upon medical ethics.

In the "Principles of Medical Ethics"[10] of the American Medical Association, Chapter III, Article I, Section I, we find the following:

"The obligation assumed on entering the profession requires the physician to comport himself as a gentleman and demands that he use every honorable means to uphold the dignity and honor of his vocation, to exalt its standards and to extend its sphere of usefulness. A physician should not base his practice on an exclusive dogma or sectarian system, for 'sects are implacable despots; to accept their thraldom is to take away all liberty from one's action and thought.' (Nicon, father of Galen.)"

Again in Section III of the same article, we find the following:

"A physician should be an 'upright man, instructed in the art of healing.' Consequently, he must keep himself pure in character, and conform to a high standard of morals, and must be diligent and conscientious in his studies. 'He should also be modest, sober, patient, prompt to do his whole duty without anxiety; pious without going as far as superstition, conducting himself with propriety in his profession and in all the action of his life.' (Hippocrates)."

From its modest beginning with the discovery of the "unknown" ray, by Professor Wilhelm Conrad Roentgen in November, 1895, which was followed in July, 1898, by the discovery of radium by Madame and Pierre Curie, radiology has gradually, though rapidly, developed into a comprehensive and highly technical branch of

medical science and medical art. At the same time, this development has been so far reaching that hardly a branch of medical science exists which has not profited by the extension of radiology. Indeed, out of this inter-relation of radiology and the other branches of medical science and practice have arisen some apparent complications in the relations between the radiologist limiting his practice to his field and the other physicians referring patients to him for his professional services.

While many physicians practice certain phases of radiology, they do not attempt to qualify as radiologic specialists. Many physicians do a limited amount of pathology, urology, pediatrics, and so on; but these, for the most part, do not accept patients from other physicians for such special service. Most general practitioners do a limited work in surgery, but when an operation of any magnitude is in prospect, the patient's best interests are served when he is referred to a specially trained surgeon.

Newell[11] says that

"in the early days the new discovery was taken up by an extraordinary array of doctors, scientists, and dilettantes. Clinical radiology was at first in the hands of those who could make the tubes and machines work, often electricians or photographers without medical education. But for some years now radiology has been definitely a medical specialty, however intruded upon by laymen and chiropractors."

Medicine is not the only field in which a high degree of specialization is to be found; it is found also in the field of education, engineering, mechanics, law, and many others. Then it might more readily and naturally be expected to arise in a science so broad and so vital to human life and health as medicine. An electrician may do a fairly good piece of work on a plumbing job, or a carpenter contractor might build an acceptable and handsome cottage; but when a mansion or an office building is wanted, a trained architect is called in. It is useless and fruitless to deplore the fact of specialization. We, as physicians, should welcome it as a day of greater happiness, better health, and longer life. It is conducive alike to the promotion and elevation of the standards of the profession, the welfare of the people and a sound public policy.

Radiology has been defined as the science which treats of the properties and uses of the roentgen rays and radio-active substances. The practice of radiology is logically divided into two main fields, diagnostic and therapeutic. In the two fields, the relations with other physicians may differ slightly. In the diagnostic field, the radiologist is more strictly a consultant. While in the field of therapeutics, he is not only a consultant, but a clinician in the sense that he is to offer counsel and advice upon the question of the appropriate radiological examination in a given case or the appropriate application of the therapeutic measure. Not that he should assume to take care of every phase of the patient's treatment, such as the administration of medicine, and diet, but more nearly ideal conditions are obtained when there are close association and frequent conferences with the clinician.

Indeed, in private practice, the radiologist has the opportunity of referring important cases to his fellow clinicians in the fields of urology, eye, ear, nose, and throat, surgery, gastroenterology, as well as pathology and dentistry. Hence, we see the privilege of referring patients is not altogether a uni-directional affair.

Dr. B. H. Orndoff[12] takes the position that:

"As our specialty becomes more stabilized, we see roughly two divisions in practice: one, in which the radiologist's entire time is devoted to patients in group practice, and his clientele referred; the other, in which a portion or all of the radiologist's clientele is private and he directs the entire medical management. With the private patient, the radiologist is obviously conscious that he is the patient's doctor. The radiologist with the referred clientele is, by the nature of things, in a somewhat different position and may become inclined to drift in the direction of the true scientist, who may discover a disease and direct its healing. May I urge that, without regard to the class of practice we undertake in radiology, we do not become disease detectors and curers, but above everything, we remain physicians in our attitude toward the patient.

In this connection, something can also be said with regard to the attitude of the patient. Some time ago, I received a call from a doctor who said that he was sending a patient who was expectorating blood. There was a family history of tuberculosis and a personal history of a peptic ulcer syndrome. The referring physician gave me the problem of finding the source of the hemorrhage. The x-ray examination of the chest was negative, but that of the gastro-intestinal tract revealed a duodenal ulcer. This illustrates to my mind the ideal relation between the referring physician and the radiologist. In this connection,

I may say such an attitude is conducive to the inspiration of confidence on the patient's part, both in the clinician and the radiologist.

Again quoting Dr. Orndoff:

"The principles of medical ethics, observed by the radiologist, should correspond to those in other divisions of the practice of medicine. If the radiologist is in private practice, the major portion of his work will be in his management of the clientele, referring such cases as become necessary to other specialties, and correlating all of the required data for proper care. If the radiologist has a consulting practice in connection with the medical staff of hospitals, clinics, and other institutions, his study of the patients and his relationship with them varies considerably, inasmuch as it is more indirect, through the referring physician."

These comments set forth clearly some fundamentals which are well worth keeping in mind. Much will depend upon the referring physician's attitude and also much depends upon the radiologist's attitude in turn as regards the impression made upon the patient.

We, ourselves, are charged with the responsibility of using terminology conducive to a right attitude both on the part of the physician and the patient. As radiologists, we need not be sensitive when we are called the "x-ray man"; nor should we be too harsh when a fellow physician requests an "antero-posterior and lateral picture" of an injured limb. Yet from such terminology arise some of the problems which we are here to discuss. The erroneous term "picture" for example, can in no true sense of the word be applied to the product of the usual diagnostic procedure. It has only one element in common with a picture and that is, it is immersed in a developing solution to bring out the record of densities which it is to portray. Furthermore, when referred to in these terms, a wrong impression is often created upon the part of the patient in that he may think he is only having a picture taken which he should be able to take to his home and keep for his own satisfaction. Instead, the roentgenogram is the reproduction of the various densities and morphology of the body through which the rays pass. They depict only these differences of density and mean nothing to a layman, but have value only when interpreted by a physician, the basis of which interpretation is his knowledge of anatomy, physiology, and roentgen pathology. Just as a pathologist interprets his microscopic slide in terms of disease based on his special training in his field, so does the radiologist make such interpretations of the roentgenogram.

Dr. Lawson[13] has expressed the referring physician's attitude as follows:

"A physician should refer a patient to a radiologist for consultation as regards a certain medical question and allow the radiologist to follow such procedures as, in his opinion, may be indicated."

When a patient is sent with request for such specific technical procedures as aforementioned, such as "antero-posterior and lateral exposures," these are to be accepted only as suggestions, and are not to be followed literally unless in the radiologist's judgment they fully cover the ground in this specific case, or unless there be some psychological reason why it is better to follow them. But if his judgment should dictate other procedures, he may well employ as many of the other physician's suggestions as possible, and then tactfully add those dictated by his own judgment. As a matter of fact, such technical procedures are the foundation training, even of a technician, and the mention of them is not only superfluous but often confusing. It is far better for the referring physician to give at least some history as to the indications for which he is having the examination made, and leave the technical procedure entirely in the hands of the radiologist. Much better results and happier relations can be obtained with this type of cooperative effort.

Again, the patient often feels that a small film or two should not cost him $5.00 or $10.00. If, on the other hand, the referring physician has the attitude described above, he can transmit that same attitude to the patient, omitting terms which cheapen the whole procedure in the patient's mind. The patient would then feel that he has had a medical examination and that he is paying for medical service instead of a sheet of celluloid.

A very disconcerting situation is often developed when a physician tells his patient to "go down to Dr. Blank and tell him to make a picture of your chest" (or your knee or something else), "and I'll come by later and tell you what it shows." Inadvertently, he may do more damage to roentgenology as a science and to the roentgenologist as a physician than any-

one can imagine. There is, of course, no objection to the patient's knowing that his family physician or specialist, as the case may be, will see and will study his roentgenograms; but he, the referring physician, can do this without either sacrificing his own dignity in the matter or discrediting the modality used in the patient's examination or the dignity and professional standing of the radiologist. He may say, "I am referring you to Dr. Blank for an x-ray examination. We will see what he can do to help us." Then both doctors are free as physicians to collaborate in the diagnosis without sacrifice of dignity or reputation, and the patient is impressed that each is interested in helping him. Each has made "some" contribution, either technical or professional or both.

Henry J. Walton[14] says:

> "The radiologist should fill the role which the nature of his specialty implies, that of a clinical consultant who adds his knowledge and art to the findings and opinions of other clinicians, thus arriving at a more immediate and accurate diagnosis. This can be done most satisfactorily when the radiologist has clearly in mind the problems of the referring physician."

Another problem of considerable concern is: who owns the roentgenograms? This is a question which patients often raise, and therefore is of interest to all physicians.

It is interesting to note that the Supreme Court of Michigan, in 1935, held that they belong to the radiologist or the office in which they are made. Other court decisions are in complete accord with Michigan. It is observed that the roentgenograms constitute a valuable record both to the patient and to the physician. They should be filed for protection from moisture, dust, and fire, as well as for ready reference. They serve as cumulative evidence in the hands of physicians on various subjects and often are the deciding factor in determining the diagnosis and in prescribing the treatment. Furthermore, they may serve a valuable purpose in determining the extent as well as the location of a disease and its progress from time to time. Last of all, in personal injury litigation, they sometimes play a feature role in winning a claim for the patient.

The patient's desire to see the films should be discouraged, but often his curiosity must be satisfied even though he does not understand what is portrayed. But this practice is common, and it is difficult to satisfy the patient if he is denied this. On the surface a problem between radiologist and patient, it becomes a problem as well between the radiologist and the referring physician, if the patient is not the radiologist's alone. Undoubtedly, the best procedure is to discuss the case and findings with the referring physician before showing or demonstrating them to the patient. Sometimes, it is not advisable that the matter be discussed with the patient at all. It is the purpose of radiologists and the practice of most of them, to report directly to the physician in charge and he, in turn, to the patient. However, the patient or his family has a right to know the results of an x-ray examination, and usually the radiologist is best qualified to inform them. This is especially true of out-of-town patients not accompanied by their physicians.

The problem of patients referred for radiation therapy is somewhat different, though essentially the same, except that the radiologist should be the physician best acquainted with the various diseases and conditions which are amenable to radiation therapy. He is in a position to render valuable aid because of his training and experience with therapy in a given field. He should, therefore, not be regarded as a mere technician to apply the remedy, but a consultant in deciding whether radiation is indicated in a given case. Furthermore, by the same token, he is the best judge of how it should be applied and in what dosages. A situation which often brings forth misunderstanding and some discord arises when a physician tells a patient he is sending him in to Dr. A. for a few x-ray treatments; or what is worse still, he may phone or write a so-called order to the radiological department to "give this patient an x-ray treatment once a week for eczema, please." Any, or all, such expressions are obviously out of order and are calculated to produce unfortunate complications. If, when the patient arrives, the radiologist outlines the course of treatment, and his outline should differ from that previously given by the other physician, the situation immediately resolves itself into a question of the confidence the patient has in the one or the other. Unless there can be mutual understanding, in which the patient can be satisfied that the doctors are agreed, he is

likely to decline to take the treatment of one, or perhaps both of them. A case in point may be cited as follows:

A short time ago, a woman was referred to me for a "short course of pre-operative radiation treatments of a breast tumor." When the patient arrived, she asked me to outline the procedure; I told her that I would give her a treatment daily except Sunday for three to four weeks. At the end of eight to ten days, the referring physician sent for her, stating that he had arranged to operate the following day. This was a surprise to her in view of the fact that she was fully aware that she had not completed the course of treatment I had outlined, and further, she had not expected the operation the following day and had made no preparations for it. Naturally, she was confused, and the question arose in her mind as to which doctor knew best. This, of course, resulted in considerable embarrassment on the part of the referring physician as well as to me. Fortunately, we were able to clear out the matter after conference with the referring doctor. She continued her series of radiation treatments and now seems satisfied.

It is to be remembered that whatever affects the reputation or economic status of one physician or group of practitioners, will reflect upon the profession as a whole and upon each in particular. We are all bound up in the bundle of life and are largely responsible the one for the other, and all of us together for the preservation of the dignity and integrity of our profession.

Gemmell[15] says:

"A word should be said about us as individuals. It is up to us to do the best we can professionally in our own communities, both in work and in our contact with medical confreres and institutional associates. For we have continually to show proof of our worth, and by so doing, we are enabled to solve many of our local difficulties satisfactorily."

As radiologists, then, it should be our aim and utmost effort to maintain at all times the most cordial relations with our colleagues of medicine in all branches, and to endeavor to elevate the standards of our noble profession, that it may serve an ever-widening circle of the sick and injured. The Golden Rule[16] as given us in Holy Writ and pronounced by the Nazarene summarizes the principles of ethics applicable in any business or profession. If accepted and conscientiously followed, even with all our human limitations and imperfections, it will solve many vexing problems and prevent many embarrassing situations among us:

"Therefore all things whatsoever ye would that men should do unto you, do ye even so to them, for this is the law and the prophets."

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THE UNDERGRADUATE CURRICULUM IN MEDICINE*

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The essential requirements in the undergraduate curriculum in medicine are set forth by the Council on Medical Education and Hospitals of the American Medical Association. These are met by all schools of medicine approved by the Council and by the Association of American Medical Colleges. In the main, these requirements have to do with minimum standards of classroom and laboratory facilities and equipment, with hospital and outpatient clinic facilities and patients for study, with subjects to be taught and total time to be spent in instruction, and with suggestions for the appor-

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tionment of instructional time among such subjects.

It is not my intent to review these requirements or to make suggestions for their revision. They are respected, and their effectiveness, it is believed, is manifest, since American medical education, based upon these same requirements, has reached the status of world leadership. With no more than passing reference to the accelerated program, to the ASTP, and to the NCTP (V-12), I should like to comment briefly on certain other aspects of present day medical education which appear to me to merit more study and consideration than are ordinarily given them. And may I state here, parenthetically, that in commenting on some of the current problems of medical education, while a few suggestions are offered, immediate solutions are not apparent.

The problems that exist in medical education are inevitably related to medical practice and medical care, and all of these, obviously, are related to postgraduate education. The time allotted for this paper does not permit more than fleeting reference to the relevant aspects of medical practice and medical care, but certain points warrant mention.

(1) It has been said that at least three-fourths of the patients in the average community and in the country as a whole should be treated by the generalist in medicine. (In an effort to be consistent in the use of terminology, I like to use the term, "generalist," rather than the label, "general practitioner," as the antithesis of "specialist." Perhaps terminology has minor significance, but perfectly good and sound terms have come into disrepute as a result of poor usage and unpleasant association.)

(2) In contrast to the need, however, two-thirds of the graduates in medicine enter one of the several specialties in medicine and surgery.

(3) The distribution of physicians in the several states and in the nation is not equitable on the bases of population and of need.

(4) The costs of medical care are disproportionately great to many population groups. Frequently, those least able to meet the cost have the greatest need for medical care.

(5) Hospital service and care, likewise, are not distributed on equitable bases, and prepayment plans are not everywhere available.

These important questions will not be answered easily or immediately. Further, it is believed that the national health plan of medical and hospital care under compulsory nation-wide insurance and service, as proposed in the Wagner-Murray-Dingell Bill amending the Social Security Act, will not in itself meet the need. There is high probability, however, that some plan will be developed and finally passed by Congress. Medicine, including medical education, should participate positively in developing a sound plan for national health, medical, and hospital care programs.

Medical education is related inevitably to these and to other aspects of the broad subject of medicine. The program eventually to be developed will determine to a very great extent the type, the quality, the quantity, and the scope of practice, the income, the facilities for diagnosis and treatment, the educational facilities (undergraduate as well as graduate and post-graduate), and the opportunities for professional advancement. Some of these will be advantageous, but more than a few will be disadvantageous. The advantages will include improved diagnostic and hospital facilities available to rural population groups, resulting in enhanced opportunities for more effective and more satisfying careers for the generalist and for the specialist in group practice. The disadvantages will include the evils of bureaucracy (probably less under state than under Federal administration but bureaucracy in either instance) and loss of individualism with the development of regimentation. Undoubtedly, there will be a narrower spread of incomes from minimum to maximum, with more physicians having reasonably good incomes than at present.

Reference has been made to problems and to their solution. To raise the question of problems raises also the question: "Is there anything wrong with medical education?" Indisputably, the war has brought many disturbances to schools of medicine, the most important of which involve depleted teaching and hospital staffs and increased teaching loads incident to the accelerated program. In many schools, one-third fewer teachers have one-third more teaching to do than formerly. With the expiration of the present emergency, this difficulty will be solved in part with the return of members of teaching staffs now on military leave. While acceleration

may be offered as an option in several schools, most Southern schools probably will abandon the accelerated program as soon as possible. There can be no denial of the fact that the effects of the Army and Navy specialized training programs, in pre-professional, in professional, and in post-graduate phases, will be felt for many years to come. The immediate effects are bad enough, but the inadequacies of the 9-9-9 plan of hospital training are more dangerous to the future supply of qualified physicians, both generalists and specialists. The 9-9-9 plan simply does not permit adequate graduate training on the accepted standards operative prior to 1943.

Of greater and more particular interest at this time, however, are those problems which existed prior to the war and which still lack solution. Some of these are inherent and have existed from the beginnings of the modern era of medical education; others are linked with the renaissance which occurred in this country during the period, 1890-1920; still others, though important, will not even be mentioned herein. All merit attention, study, and effort directed at correction.

On studying the curricula offered in most American schools of medicine, the student of medical education is struck by the fact that first and second year students are kept away from patients and from the study of the manifestations of health or ill health in the living subject. Others interested in the subject have advocated the revision of teaching methods, suggesting that anatomy be studied as a living science and as human biology approached through the study of living human subjects, that the physiology and biochemistry of the human organism be studied rather than that of lower forms of life, and that microbiology be approached as a study of infections in the human to a far greater extent than at present. Usually, the student's first opportunity to study the clinical aspects of the living human subject comes late in the second year in the course in physical diagnosis. Even here, however, limitations operate in the number of individuals studied, in the scope of possible observations of all types of individuals, and especially in the study of the whole integrated individual. In most American schools of medicine the study of cases of ill health predominates. In the more nearly ideal curriculum, should there not be more time for the intensive study also of an adequate number of individuals in the status of good health?

These few points, touching as they do only upon a few aspects of the greater subject, raise questions related to the following topics: objectives; type of teaching; quality of teaching; length of the course; correlation and timing of courses; standards of premedical education; selection of qualified candidates for the doctorate in medicine; standards and methods of appraisal of student achievement and promotion; reorganization of curriculum; reorganization of faculty; recruitment of personnel for teaching and research; salaries, tenure, and opportunity for advancement; the need for revision of licensure standards and methods; et cetera.

May I comment briefly on a few of these topics?

Objectives.—Medicine has long since passed the stage in her development where any one man is able to cover the entire field and be competent in all branches. The extension of the horizons of the past few decades particularly quite properly encouraged the development of specialization in medicine. The fragmentation of medical education, essential for the graduate training of specialists, probably has had too great an influence in undergraduate medical education in which the primary objective might well be a general training in medicine. The need in America is for the generalist in medicine, for the well-trained man who can handle effectively the majority (75-80 per cent) of the patients needing a physician's services. This same need probably exists in other countries as well, the supply to come perhaps from America in the immediate postwar period. America will be expected to provide no mean stimulus to and facilities for educational opportunities to those of other countries. Clinical medicine, unfortunately, is usually taught as a series of specialties; frequently, also, in the internship, now generally looked upon as the fifth year in medicine, the training is provided through specialties and by specialists. The department of medicine, with the largest allotment of time in the clinical years' schedule, sometimes presents the only opportunity in the curriculum for the study of the whole patient as an integrated individual. Even here, however, sometimes the viewpoint is that of a special field within medicine; namely, internal medicine.

Actually, the curriculum in medicine as it now exists, has developed without too much planning. In most schools, the student is required to study certain phases of the medical sciences and of the clinical fields, each in a well-formed compartment in itself but not related to the others. The student is confronted with the task comparable to that before the builder who has the materials with which to build a structure but no blueprint to follow. In the past, many have been able to build quite satisfactory structures even under these circumstances, and they have been able to practice a good quality of medicine therewith. These physicians have been successful, however, in spite of the present system and not because of it. How much better it would be if we could give the student of medicine a blueprint of a structure architecturally sound and help him to use his materials in the form of the information he acquires, to build a structure which will take any kind of superstructure. In other words, should not undergraduate medical education equip the candidate for the degree with a planned educational experience qualifying him as a generalist, understanding medicine, capable of doing the job so urgent today, permitting him to enter a specialty if he so desires, but with a minimum of lost time in gaining maximum efficiency?

Type and Quality of Teaching.—In connection with type and quality of teaching, the question of course content and the distribution of time between lecture, laboratory, and demonstration is inescapable. One wonders how much knowledge gained from some lectures and from some time-consuming laboratory experiments is retained as of value to the practicing physician. Perhaps some of the methods used by the Army and Navy are improvements which could be adopted with benefit to medicine and to medical education. This problem merits extensive study, including, perhaps, an appraisal of the value and usefulness to the physician of his formal medical education and an answer to the question, "How can he be better prepared for his work?"

There are those who question the worth of the developments of the past generation in the field of education, particularly in technic, but few of those informed on the current situation will deny that there is too little good sound educational procedure in medical education today. Many teachers not only have had no training in education per se, but frequently have expressed frank disinterest in education. It is a hopeful sign that this attitude is changing to one in which there is an interest in improving the quality of teaching and in extending the use of proved educational technic. We attempt the appraisal of the quality of the work of the student in medicine; should we not attempt also to appraise the quality of work done by the teacher to justify his promotion or dismissal?

Length of Course.—Few will disagree that the four years now used in the regular course in medicine constitute too short a period of time for the student to learn and to understand the great mass of material presented to him. Many say that the attempt is made to teach too much in too little time, but few are willing to delete material from their own courses. Most of the difficulty has arisen from continued additions as new developments have come into existence, with no subtractions even as we learn that some of our "knowledge" was not of lasting value.

In the present scheme of things, the rigors of the course are increasingly greater, with the pace so fast and so highly competitive, that only the unusual intellect can maintain it. Most of those having to do with selection of students as candidates for the doctorate in medicine interview the attractive, interesting, well-bred, cultured, promising youngster of good character and attractive personality, who wants to become a physician, who might make of himself a physician had he the opportunity to do so at a little slower pace, but who would have a difficult time in the regular course of four strenuous years. Are we doing the right thing for the boy and for medicine to deny him the opportunity which he seeks? Might it not be worth-while to try a plan in the postwar period, whereby such a youngster might take five years to complete the course?

Then there is the exceptional individual who has a flare for and an interest in research. The all-too-little free time is not sufficient for him to do what he wants to do. A modified plan might permit him to take five or even six years to complete the course. He could drop out of regular course work to pursue his research, as he may and indeed is encouraged to do in a few schools, or he might continue on a flexible part-time schedule.

Premedical Requirements. — Dissatisfaction with premedical sciences taught in those liberal arts colleges not closely related to schools of medicine, is not new and is rather widespread. Should the requirements include specific subjects and offer little opportunity for flexibility in premedical education? Should there not be consideration of qualifications, perhaps set forth in terms of a liberal education of three or four years and an extension of the course in medicine to five years, the first to be devoted to special aspects of physics, biology, and chemistry? As pointed out previously, however, few Southern schools will want to modify the length of the curriculum in the other direction, that is, to remain on the accelerated program even if augmentation of the faculty beyond prewar levels were possible.

Correlation of Courses.—The suggestion of correlating courses by the timing of discussion and study of different aspects of the same problem is not new; in fact, attempts at correlation are under way in several schools of medicine. The subject was discussed at the recent annual meeting of the Association of American Medical Colleges in Detroit. A Southern school, Bowman Gray School of Medicine of Wake Forest College, appears to have gone farther toward the solution of this problem than most other schools, perhaps because of fewer obstacles in the form of already existing departmental organization and time-honored traditions. The younger school has a better opportunity than the older to make changes in course timing, course content, teaching methods, and interdepartmental planning.

In most medical schools, faculty organization is very highly departmentalized and this has resulted in compartmentalization of teaching. Mere reorganization of the faculty into fewer departments will not correct the situation and produce the end-result cited, but it is a step which, if made in the right direction, should aid materially in correlating teaching and in helping the student to integrate his knowledge. We leave to the student entirely too much of the integration of the various aspects of a clinical problem. In some schools, even today, the immediate objective before the student appears to be the passing of examinations in the several subjects, which, unfortunately, may mean memorization of certain points as emphasized in the teaching by one individual or by one group as contrasted with those presented by others or in the literature. If all aspects of the same problem might be presented at one time, as is done in regular conferences held in several schools, notably Yale, Cornell, Texas, Harvard, we should go far in helping the student to visualize the whole picture. This, obviously, means that the teaching of the medical sciences would be extended into the clinical years and that teaching of the clinical subjects would be extended into the earlier years. Under these circumstances, open-minded instructors and students alike will come to see an individual area of knowledge not as the most important subject in the curriculum but as an important unit in the integrated whole, as a part of the greater field of medicine, as one link in the chain. Then, and then only, will each subject be taught not for its own sake but as a part of medicine.

Recruitment of Teaching and Research Personnel.—Too frequently in the past and at the present time, in medicine as in the military services, it is assumed that if a man has been trained in his field and has achieved a reasonably effective proficiency, automatically he is able to teach others the same subject. The doctorate, no matter in what field or of what type, has been looked upon as complete qualification for teaching. "Doctor," basically, does mean "teacher," but unfortunately not all doctors possess the ability to teach. Even if one has world renown for important contributions to knowledge through brilliant research, that individual may be, in fact not infrequently is, a poor teacher. Research by qualified personnel is highly important; but teaching, likewise, is of major import in medical education. Medicine needs the best teachers obtainable. Every facility and encouragement, including adequate salary, tenure, opportunity for advancement, and increment in salary, must

be provided if the best are to be attracted. Active recruitment is essential to success. It is more than difficult to find them and to keep them! The quality of medical education will be ever higher when we have the best teachers in schools of medicine.

In summary:

(1) Medical education is related to and must be geared to medical practice, including improvements in medical and hospital care programs now developing.

(2) The medical curriculum of today requires study, with appropriate and extensive revision directed at the correction of existing ills and defects.

(3) Special emphasis is placed upon the need for study of:

(a) objectives of the schools of medicine;
(b) types and quality of teaching;
(c) length of the course with modifications under certain circumstances;
(d) premedical requirements vs. liberal education;
(e) correlation of courses; and
(f) recruitment of teaching and research personnel.

(4) These few points raise numerous other questions and implications, a few of which are cited:

(a) evaluation of educational needs of the graduate in medicine;
(b) reorganization of curriculum;
(c) wider application of existing educational principles and methods;
(d) development of new educational methods needed for medical education; and
(e) reorganization of school and faculty.

All these and others need study and action to the end that in undergraduate medical education an even better job may be done in aiding young men and women to make of themselves physicians.

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Discussion follows paper of Dr. Kostmayer, page 627.

MEDICAL EDUCATION ABOVE THE UNDERGRADUATE LEVEL*

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The title of this paper was chosen with malice aforethought. It permits of rambling over an arc whose radius is the average life-span of the graduates of our medical schools. Hence the only limitation on material available is the thinking capacity of the essayist. On this score the audience will, of course, feel at ease, more particularly since there is a time limit on the presentation. The title permits of indulgence in censure and a bit of preaching, both of which are wonderfully comforting to the one dealing out the censure and preaching the sermon. Before either is begun, it should be understood that "Graduate Medical Education" is here accepted as meaning only the training that leads a physician to acquisition of an advanced degree, the master's or the doctorate, and that postgraduate medical education is accepted as meaning all other forms of continuation study for the physician, no matter how long or how short the course.

Very few schools of medicine in this country can show evidence of interest in their own graduates, to say nothing of interest in doctors of medicine in general. True, medical alumni have been expected to contribute very generously to campaigns for endowment, and in late years medical alumni can even find an occasional invitation to attend ward walks or a clinic or a seminar. But by and large the schools of medicine have figuratively written "finis" instead of "commencement" on each diploma handed out. Guidance for senior students into internships is available when it is sought, but is not systematically distributed, and choice of residencies is left almost entirely to the individuals, uncertain and inexperienced as most of them are. This, of course, is not universally true, but it happens thus all too frequently, despite the fact that it is trite to repeat that the undergraduate training can rarely do more than lay a founda-

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tion on which there can be built a knowledge of the science and art of medical practice. There is no gainsaying the importance of painstaking in laying the foundation. But if the erection of the superstructure is to be left almost entirely to the novices themselves, many shaky and unreliable edifices must be expected, as indeed is too often exemplified.

Pure graduate training in medicine should undoubtedly be given under the auspices of the graduate school of a university. It certainly seems inconsistent to call anyone a "master" unless and until he has actually mastered the available information in the field in which he is working. To suggest that this can be done in less than two calendar years is to suggest that the degree is hardly worth the effort. Certainly these remarks apply more forcibly to the doctorate degree. Only those with outstanding accomplishments and profound knowledge of the basic sciences involved should be granted this certificate of proficiency. So much (or so little) for medical education on the graduate level. But it is post-graduate or continuation study that this paper emphasizes.

Surely no year in the lifetime of medical student or physician can possibly be more important than his first intern year. Here at once are formed habits of thinking and habits of practice that often endure throughout life. And yet it is rare indeed that a medical school as such supervises the training of interns, even where the internship must precede the award of the M.D. degree. Surely no better time or place can be found for the inculcation of habits of thought and action and principles of conduct and practice than this exceedingly formative period of development. Into this year could and should be concentrated more teaching effort than in even the senior year in the walls of the medical school. Not only should there be systematic clinical instruction, but the so-called preclinical subjects should be rather thoroughly reviewed, particularly topographical anatomy and physiology. This is not a plea for a fifth or intern year as an undergraduate activity; it is a plea for a year of fine postgraduate instruction by the faculties of the schools of medicine. Of course this is a somewhat simple affair where the interns are in the teaching hospital, but it should not be difficult even where the hospital is far removed from the school. In such situations the attending staff should be organized by the medical faculty, and the teaching efforts of the attending staff should be supplemented by visits from members of the faculty. It is hard to conceive of anything better calculated to raise the caliber of those seeking internships, so it is doubtful that any attending staff could long hold aloof from such a program. As a matter of fact, such a proposal has been made by more than one attending staff, and will be eagerly sought by others as soon as normal conditions are restored, since in the new order proper distribution of medical care will center around hospitals which must attract good interns. Members of the attending staff would be pleased to accept appointment on the faculty, with or without modest honoraria. Such a liaison would have other very obvious advantages. Surely the intern year offers fertile soil now almost entirely uncultivated.

If the internship were properly utilized for postgraduate education, teaching in the resident years could be largely clinical. However, these years offer wonderful opportunities for clinical research by these young physicians, and special study in the basic sciences, as, for instance, in preparation for examination by certain of the specialty boards. Certainly the medical school faculty should recognize and improve the opportunity for continuation study for the residents, and should accept the obligation to direct and supervise this study, either directly or by close cooperation with an attending staff. If the interns were properly instructed, they, when they become residents, could and should assume much of the burden of teaching the oncoming classes of interns. With the cooperation of hospital authorities and the faculty members in the preclinical years, this could all be done without overburdening the medical school teachers. But what if it be a burden? Is anything, even instruction in the conventional four undergraduate courses, any more important? Once again, does anyone believe that a student of medicine can in the four undergraduate years become a physician? It seems to me high time that we recognize that commencement for medical students means exactly that. If the hospital is the unit around which adequate medical care is distributed, and I believe it is, then acceptable hos-

pital care is determined ultimately by the quality of the service rendered by the interns and residents. And unless these are carefully taught and closely supervised, only in rare instances will the service even approximate what the public is entitled to.

Continuation of education for the physician practicing in any field of medicine may be, from the point of view of the medical school, either extra- or intramural.

One fruitful source of extramural teaching is the medical school library. Physicians living within the geographical area served by the school could be encouraged to "join the library." For a fixed annual fee, books and periodicals could be sent out and research could be done by the library staffs. While this latter service is available elsewhere, and while the former is already in practice in some sections, the practice is not widespread and is rarely indulged in by the medical school.

The second extramural teaching activity is that devoted to extension courses. This is so expensive as to require subsidy, usually reaches only the better qualified physicians in a given area, and is by no means the highest conceivable type of post-graduate instruction. If these courses consist only of formal lectures, they are hardly worth the effort. If, however, the instructor spends at least one day in a community visiting patients in homes or in hospitals, going over office records or cases, and discussing current or recurring problems with the local doctors, this type of teaching cannot be summarily dismissed. The following information may be of interest:

Thanks to the generosity of The Commonwealth Fund, we conducted extension teaching in two Southern states. A field organizer, a layman, went out into the areas, divided each state into circuits, and chose centers in each circuit. He also visited each physician and solicited his interest and registration. A fee of only $5 was charged, which paid only a small part of the cost, but was demanded as evidence of some interest. The figures following are for both states combined, and for four sessions, 1937-38 through 1941-42:

Two thousand forty-seven physicians attended one or more meetings. Nine hundred thirty-one patients were seen by the instructors in consultation with local doctors; one hundred twenty-three talks were given to lay groups (Kiwanians, parent-teacher association, high school girls, and so on); approximately twenty thousand seven hundred persons attended these talks; and eighty-eight patients were presented to groups of doctors as clinical demonstrations.

This does not indicate miraculous accomplishment nor a revolution in medical competency, but there is a suggestion of aroused interest and at least a degree of fulfillment of a crying need. There is the further suggestion that persistence and improvement might indeed finally show results comparable to the efforts put forth, more especially when good hospitals become more plentiful so that this form of teaching may center around the hospital.

There are several varieties of intramural post-graduate teaching in which all medical schools might interest themselves. Very short review courses, five days to two weeks, reviews of four weeks' duration, more practical courses of three to six months, courses of a year or longer, and short intensive courses.

Before the war we hesitated to try the very short review work because so many of our registrants had come from fairly long distances. At Minnesota, where Dr. William A. O'Brien has been so successful with this type of continuation study, most of the registrants were from not very far from Minneapolis, at most from within the state. However, when war conditions made it certain that physicians would not be able to take weeks off from practice for the longer courses, we instituted courses of four and five days' and two weeks' duration. In the session 1942-43 there was a course in pediatrics of four days; one in internal medicine of five and a half days; and two in surgery (non-operative) of five and a half days each. For each of these courses there was a guest speaker of national prominence in addition to the regular faculty. There has developed in the giving of these courses a splendid inter-departmental cooperation which, while started here, now carries over

into other school activities, a gratifying by-product of these efforts.

In the four short review courses for the session 1942-43 we registered a total of 176 physicians. We were too busily engaged in wartime teaching to offer more courses this session, but were sufficiently encouraged to offer nine short reviews during the next session, and two reviews in tropical medicine of two weeks each. In these eleven courses we registered a total of 374. Another 83 doctors took intramural continuation instruction of some form during this latter session, including short intensive courses, such as cardiology or cystoscopy.

The most popular and most valuable features of the review courses are the round table discussions, ward rounds, and out-patient clinics. This is definite evidence, I believe, of sincere interest on the part of the registrants. There is a perceptible enhancement of this interest by patient-contact. The serious postgraduate registrant wants only a minimum of formal lectures.

It would be easy to go on with a description of the longer reviews, the five-months' course in tropical medicine and medical parasitology, and the one-year courses, or departmental assistantships. But it is not the present purpose to discuss details. Rather, it is desired to emphasize necessity for this type of endeavor and to urge that this is the duty of the medical schools. The statement is frequently heard that, on the contrary, continuation courses are the jobs of organized medicine. This is fundamentally wrong, and realistically it is thrice wrong. We have only to glance at the record of attempts at better distribution of medical care to realize that not only will there be no concerted action, but the efforts of others will be resented. On June 12, 1934, the House of Delegates of the American Medical Association adopted resolutions condemning the American College of Surgeons for proposing a prepayment plan of medical care. Moreover, there is a dearth of pedagogic skill even in the medical school faculties, so this necessary ingredient in a teaching program is not likely to be abundant among practitioners. The agitation for change in medical practice in this country is due in no small measure to inadequate medical service, both in distribution and quality. Poor quality is not due so often to the turning out of poorly trained medical students as it is to failure of the physician to keep abreast of rapid progress in the science and art of medical practice. This can be remedied only by continuation courses, and an effort has been made to fix this responsibility on the schools of medicine. It perhaps is not going too far to state that, despite areas of poor distribution of medical care, if every licensed practitioner of medicine were a competent physician, with integrity above reproach, we would not be concerned with the threat of state medicine. Even if this radical position is not accepted, the need of concerted action by the medical schools is apparent. The demand of returning veterans is bringing to the fore necessity for planning for that which should long since have been in operation. It is my fond hope that what grows out of this necessity will carry over beyond the emergency to the end that as much consideration will in future be given to the postgraduate curriculum as has been given in the past to the undergraduate curriculum.

DISCUSSION (*Abstract*)

Papers of Dr. J. P. Gray and Dr. H. W. Kostmayer

Rev. Alphonse M. Schwitalla, S.J., Ph.D., St. Louis, Mo.—Medical students do not have to be taught in the same way as younger students are taught. There is much truth in this statement that the best teaching is no teaching. Self-education under the opportunities which the medical curriculum presents is in many respects the best possible influence for the student. The high spirit of interest in medicine on the part of the physician-teacher is one of the finest stimuli that can be found in almost any one of the numerous branches of professional education and I might also add that the comments of a good medical student who has awakened to his opportunities is one of the finest compensations for all the efforts of teaching and administering in a school of medicine.

Have you noticed the change that comes over a boy as a medical student when he has delivered his first baby? Have you noticed the change that comes over a student when after becoming interested in a patient and feeling the sense of triumph in getting a patient well, the patient unexpectedly dies? The student thus recognizes,

perhaps for the first time, the limitations of medicine. If he is a wise student, that will be the first occasion on which he makes an examination to find out where he himself may have failed. That is the moment when there is correlation, integration. The self-revelation that comes from self-study at such moments is one of the grandest influences in the life of a student of medicine.

I wish to thank Dr. Gray for his splendid presentation. By way of eliciting discussion, I should like to emphasize what I have said and bring it into contrast with certain more formal methods of correlation and integration in the medical curriculum.

I want to thank Dr. Kostmayer for his enthusiastic report on the program that is carried out in the teaching of physicians in practice with just a little request, that more emphasis be placed on the physician in areas where there are small groups of population. How to reach the physician in areas of 400 and 500 people, in little communities, especially the physician who feels completely lost to his colleagues, because of the fact that he has been away from the school too long or because originally he was inadequate. That poor fellow who often carries a tremendous responsibility and is the person we should try to reach.

And, Dr. Kostmayer, I would like to throw a challenge about your last statement: that the present trends in socialization of medicine are due to the inadequacies of medicine. If you examine the people who are backing and propagandizing for the socialization of medicine you will find that the roots are not in concern for the health of the American people.

Dr. Philip A. Shaffer, St. Louis, Mo.—Education like most human affairs is full of paradoxes.

We must pay great attention to the premedical professional training. But how do we do it? We set up a list of courses, so many hours of this and so many hours of that. And at the last meeting of the Association of American Medical Colleges, a motion was made that as soon as we can we go back to the prewar entrance requirements. If we go back to anything prewar in education or anything else, we are going to miss an opportunity in our lives. Let us go back to something far better than the stereotyped, A.B.C. mechanical credit hours that determined the admission to medical schools.

The over-departmentalization, the lack of coherence in faculties of medical schools, is a natural consequence of the development of medicine. If you will think of what medicine was before 1900 compare it with today, what is the difference? It consists of just one thing, and that is what the medical sciences have contributed to the understanding and practice of medicine. Human insight, understanding, the bedside manner and judgment acquired from long experience were, unless I am very much mistaken, not inferior a century ago to the same qualities every successful physician must have today. The difference lies not in that sort of thing, but in factual information that has come through the application of experimental methods and quantitative observation.

The progress is so fast that no member of the staff of any medical school can keep up with it except in his own limited field. It is not much of an exaggeration to say that today the senior student is the only man in any medical school who knows what the curriculum is like, what its content is. So the first thing it seems to me to do is to begin to get a little cooperation or a little coordination, not for the students but for the staff.

Much is taking place in that direction on both sides of the fence. The anatomists are not doing anatomy any more but physiology and tropical diseases. The physiologist if he is making much progress now is a biophysicist or more often a biochemist, and the pharmacologist has to be a little of both. Take the three fields, physiology, biochemistry and pharmacology and try to outline the content of those departments, and you will find much larger areas in the overlapping circles that are common, than you will find in the non-overlapping areas characteristic of a single department.

It is all very well to say let the student correlate for himself. There is a good deal in the thought and spirit in which it is said. But try it. We are training now, physiologists, biochemists, pharmacologists or anatomists, bacteriologists, brain surgeons, urologists, cardiologists and what have you; but in my humble opinion few faculties, very few schools, are training enough good physicians. They are needed more than specialists. Whatever we do, we must retain the specialist, we must retain the investigators, we must retain the highest sort of specialization.

Dr. Victor Johnson, Chicago, Ill.—I agree heartily with one of the major statements that Father Schwitalla made: let the student find out for himself. What we ought to do is turn him loose in the library with the Index Medicus and a few reference works of that sort and let him go through the literature and dig up these things himself and offer advice along the way as the need may arise. Or even better, we ought to turn him loose in the laboratories and give him animals and research facilities and equipment and let him start out and find out all these things in the laboratory which have accumulated in the literature and which the teacher attempts to summarize. I think we should do this on one condition: provided we have from 50 to say 500 or 600 years instead of 3 or 4 years to do the job. Given only the 3 or 4 years, I am afraid I must agree with Dr. Gray; it is our responsibility to employ every means we can to get across to the student what is known and if we do our job decently we will, at the same time, stimulate him to reach into the unknown and work out problems in that vast area instead of wasting his time laboriously trying to learn for himself what is already known.

Dr. Alrick B. Hertzman, St. Louis, Mo.—I would like to bring up the questions of choice of content and the method of presenting content in a particular course be-

cause we still have to deal with these specific problems in teaching the student. For years, physiologists have been condemned because of their teaching of nerve-muscle physiology although this did present some of the basic problems of life (including man). Yet there was apparently little use for it in the field of medicine. Now comes a tremendous expansion in the field of physical medicine, which is nothing more nor less than the specific application of some of the well known principles that have been taught in the field of nerve-muscle physiology for many years.

Now, is the physiologist to be a major prophet and know just what is to be the technical development in medicine in the future, or is his job that of inculcating certain basic principles that operate irrespective of circumstances? Shall the teaching be an analytical one or shall it be the pigeon-hole device that Sydenham introduced and which medicine has followed ever since? Thus, if we had followed William Harvey, what would have been the story about the application of heat as a therapeutic measure? (Some surgeons use hot applications and others use cold for the same condition.) Would we have applied heat to a leg whose blood supply is practically cut off, if we really understood the effects of temperature on living tissues? Such errors become less probable when basic principles are known, but they are bound to be the result when the approach is not analytical.

Dr. Ernest Carrol Faust, New Orleans, La.—It seems to me that we still have a problem of a good medical school teacher. On the average, there are those who are splendid both in investigating and in teaching but they are rather in the minority. We have all of those categories in every good medical school, but I think there is the possibility that the teachers themselves, either under the Dean's guidance or within the department groups, may together and frankly tell one another what their difficulties are in presenting information to the student.

A good teacher should inspire a student, he should not "spoon feed" him, and he should interpret the information; otherwise, you might just as well give the student so many pages to read, and then at the end of a set period give him an examination on the subject assigned. It is for the personal contact, inspiration and interpretation that we have teachers in a school of medicine.

Dr. Russell H. Oppenheimer, Atlanta, Ga.—It seems to me that we think too much about the mechanism of doing a job. If we visualize for just a moment a medical school and a student and a clinical field for an illustration. The student goes into the ward with the teacher to see a patient. Together they go over the patient's story and examine him. There will be certain things that point to systemic disease and some that point to emotional or other psychiatric disturbance. What the clinician attempts to decide is wherein the problem lies. Now the great difference between the clinician of some years ago and of today is that the clinician today thinks differently; if he is good he thinks in terms of the structure of the patient both as a whole and of the many parts of the body, its tissues, its viscera. He thinks of the function of these and he thinks of the patient as a human being in society. From all of this information he tries to decide what is wrong. Once in a while in doing this the clinician finds that he is not quite sure of the underlying anatomy or physiology and he calls on the anatomist or the physiologist who comes in to help him. Or perchance it is the pathologist or the psychiatrist who joins in the study of the patient. This is correlation in practice. Furthermore as part of his discipline the student is led to find out some things for himself. To do this he goes to the library to look up what has been the experience of others in similar problems. That is all education is anyhow; the acquisition of experience and the utilization of experiences, your own and those of others.

If we proceed in this manner the clinician will think clearly in terms of the basic sciences and the teacher of these basic sciences will, to some extent, ask himself as Father Schwitalla said, "Is what I am teaching accurate?"

It must be remembered that the student learns only as he observes his teachers at work and is allowed to participate in this work. He is as aware of mechanisms as are we.

Dr. Wm. A. Wolff, Winston-Salem, N. C.—I trust you will pardon the statement from a faculty member of a freshman school, but at Bowman Gray we are entering on an experiment which warrants two or three points that might be of interest at this time.

In the first place, we think of medical pedagogy as intelligent guidance in the learning process. To borrow Father Schwitalla's figure, we are trying to map out the quickest and best routes to the North Pole rather than to drag the sled for the student.

In the second place, the subject of correlation might better be described as cooperation between staff members. Our medical faculty, because we make no attempt to teach any other division, is a team and it is immaterial to us whether an orthopedic surgeon or the professor of anatomy discusses the basic anatomy involved in the medical problem. That principle carries throughout the curriculum. The student in the first two years has many opportunities to see and hear about the patients. The students in the clinical years are continually impressed with the importance of the scientific requirement for handling the clinical problem.

Further, we would agree with Dr. Shaffer, 100 per cent, that we must train physicians. We are trying to train general practioners in the belief that in training a man to be a physician, we lay a firm foundation on which the superstructure of the specialist may be erected.

And finally, in relation to Dr. Kostmayer's remarks,

we are tremendously interested in the extra-mural program of the medical school. Our department of pathology does the specialized work for 26 hospitals in that area. We try to make every cross-roads physician feel that the medical faculty is literally at the other end of the telephone and that the library or consultation services through our various clinics are at his disposal any time he wants them.

Dr. Gray (*closing*).—There are a number of points I should like to raise but the hour is getting late. May I refer, briefly, to two?

(1) I believe there has been confusion between what I think of as teaching and what might be called paternalism. I certainly did not have paternalism in mind as the basis of a plea for better teaching in medical education.

(2) From the discussion, the impression might have been created that I used the words "always" and "never." I definitely avoided this in the manuscript for there are exceptions, obviously, to many of the statements made. If I learned anything in medicine it is to avoid the use of the sweeping, all-inclusive, dangerous terms, "always" and "never."

Dr. Kostmayer (*closing*). — I agree with Father Schwitalla that most of those pressing for socialized medicine are not too deeply interested in the health and welfare of the people of this country, but they are interested in regimentation, in order to dispense money and patronage, and thereby control votes. However, the point I made is that these people could make little progress if every physician were competent and with an integrity above reproach, and that we have furnished these people with a foundation on which they can build by not keeping abreast of modern medical progress.

One further brief comment: I agree that it is unfortunate that licensure for medical practice is in most states acquired for the life of the physician. However, I think it would be a pity for the state to find it necessary legally to control the continuance of practice of physicians, and that it would be far better for the profession to make this unnecessary by attracting physicians to keep well informed in medical practice.

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EDITORIAL DEPARTMENT

HYPERTENSION

In the past four years no significant advances have been made in the treatment of hypertensive vascular disease, and little has been added to the understanding of the more common syndromes in which high blood pressure holds the dominant position. Such is the situation, probably because those laboratories which were most fruitful in the investigation of hypertension, were either disrupted by loss of personnel or of necessity engaged in research of a type dictated by the exigencies of war. The latter, as Harlowe Shapely has noted, have yielded tremendous results in many fields of scientific endeavor, and have laid the ground-work for integrated and cooperative research. The study of hypertension, however, had no place in war research, and the great rate of yearly fatalities due directly or indirectly to this state has continued unabated.

In this interim period there has been increasing agreement on certain general principles concerning high blood pressure. First of all it is a symptom rather than a disease. Its origin may be nervous, that is, neurogenic, or may be humoral. For the former there is excellent physiological and morphological evidence.[1,2] For the latter the physiological evidence of a renal pressor mechanism initiated by narrowing of the renal[3,4] arterial pulse pressure is well accepted. The enzymatic nature of this system has been rather well established.[5] The existence of the rarer humoral hypertension based on endocrine dyscrasia (such as excess adrenal cortical hormone) has long been recognized, though here, too, the mode of action of the hormone is not clearly defined. The natural and artificial hypertensive agents have borne some pharmacologic investigation with the revelation that peripheral vasoconstriction is not the *sine qua non* for the rise in arterial pressure. These substances are effective probably through as many mechanisms as there are physiologic possibilities for raising the pressure.

It is becoming more and more evident that neurogenic hypertension after a time influences the renal pressor mechanism so that an irreversible augmentation of the blood pressure evolves.[1,6] Similarly the toxemia of pregnancy, defined as an acute angiospastic disorder, though transient, can affect permanently the renal hypertensive mechanism.

The prejudice against the lowering of blood pressure by any means, the fear that such measures result in anoxia and damage of vital organs, has almost disappeared. There is no satisfactory evidence for continued favor of this belief.

With acceptance of these facts there has been some clarification of the physiologic concepts of hypertension, but treatment has not been improved. The antipressor renal extracts[7] remain in the realm of experimental substances, effective, but rare by nature of their origin. The Smithwick[8] procedure and its modifications have demonstrated dorsolumbar sympathectomy to be an excellent palliative procedure in selected cases. The selection of cases, moreover, has been

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placed on a sounder basis.[9] This treatment also is beyond general use. Some 3000 patients have undergone sympathectomy since 1940, in the eight or ten clinics equipped for this measure. There are not enough surgeons, however, to treat all of the cases of hypertension.

Thiocyanates and sulfocyanates continue as an available medical regime for lowering the blood pressure. There is some dissension as to whether the pressure is actually lowered by these drugs. Most investigators agree, however, that the distressing symptoms of hypertension are relieved by the cyanates. Here again the measure is palliative, and treatment is not without considerable danger. Acute toxicity and pharmacologic activity of the thiocyanates are well recognized.[10] Whether there is damage or benefit over a long period of time is not too well known.

Other remedies have come and gone. Vitamin A is not a depressor substance. Preparations of tyrosinase are equally effective whether or not it has been inactivated by heat and so the effect is probably non specific. The effectiveness of the "rice diet"[11] has not been substantiated nor has the rationale for its use been clarified.

What is there, then, for the treatment of the ordinary hypertensive patient beyond the drugging with phenobarbital, rest, and the damming back mind and body to its lowest ebb? There is nothing more for the ordinary established case. Some ideas for prophylaxis may derive from the exigencies of the war in spite of the stalemate it has so far given the field of hypertension. In induction examinations a large percentage of selectees showed "transient nervous hypertension."[12] Proof of the prognostic value of this transient hypertension can come from the careful follow-up studies of the hundreds of thousands of such instances in the possession of the army induction boards. That this "casual" and neurogenic hypertension are one and the same is becoming more obvious. The final effect of such hypertension on the renal pressor mechanism has already been suggested. Prophylaxis against excitement, anxiety, and the strenuous life, all those factors which affect the neurogenic hypertension, is in the possession of every physician.

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SHOCK THERAPY AND THE CONDITIONED REFLEX

Since Pavlov's and Cannon's early studies upon the conditioned reflex, examples of which are salivation or gastric secretion of an animal following the ringing of a bell, flash of light, sound of a tuning fork, or other stimuli repeatedly offered before a meal, the conditioned reflex has been one of the important methods of analysis of animal behavior. Negative conditioned reflexes are also of course useful: as the presentation of certain sounds before an unpleasant electric shock. The animal may be taught to distinguish between certain musical notes. He may receive food after a low note and electric shock after a high note, and his musical ear thus studied by bringing the two notes closer and closer together until the distinction is too difficult, as in the case of the neurotic pigs who became completely distracted and ill from the difficulty of their task.

The conditioned reflex offers an objective method of study of the simplest form of mental content. It may be used upon small laboratory animals and will perhaps eventually provide a simple alphabet for psychiatry. It is something that the animal learns by experience, or inductively. He will forget it if conditions are altered and he gets the stimulus repeatedly without the expected reward. Thus memory is involved.

Gellhorn,[1] among other investigators, working in the Universities of Minnesota and Illinois, has studied the effect of insulin shock and electrically induced convulsions upon the memory of the conditioned reflex of the rat. The rat is first taught the reflex, then made to unlearn it. That is, the stimulus is administered without

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the reward until the animal ceases to respond. It is noted that the rat learns to respond to auditory (bell, musical note) stimuli much more readily than to visual (light) stimuli.

Forgotten conditioned reflexes returned rapidly after insulin coma had been induced. Particularly, previously learned conditional reflexes to sound were restored in high degree after insulin coma. Response to light was less markedly restored, Gellhorn believes, because it is less thoroughly learned. Return of reflexes after shock therapy seemed to depend upon the degree to which the reflex had been perfected before it was inhibited. The inhibited reflexes were restored but other conditioned reflexes were not diminished. Thus a definite effect of shock therapy upon mental content would seem to be demonstrated. There is a sudden return to well learned lessons, abandoned from disuse.

In cases of several types of insanity, insulin shock and other modes of convulsive therapy have been employed. The mode of action in reported successful cases is of interest. Is it through restoration of individual memory in persons who have forgotten the normal reactions of life?

Memory of the conditioned reflex perhaps can provide a beginning of an objective line of study of the simplest thinking processes, perhaps eventually of the inhibitions which underlie many forms of mental disease.

DIETARY DEFORMITY OF THE TONGUE

It is a general impression that fewer congenital and developmental abnormalities are observed now than formerly. This may be due to lowered incidence, to better preventive care, or to improved and more widely used methods of surgical correction. That a particular malformation of the tongue of chickens may be caused by a particular nutritional deficiency, that is, deficiency of a particular amino acid, is demonstrated by Grau[1] of the University of California.

During study of the nutritive value of beef blood proteins it was observed that in chickens maintained on these the distal end of the tongue is folded back onto the dorsal surface. Sometimes it appeared as though the tip of the tongue had been cut squarely off. Microscopic study revealed that the limiting factor was the length of the median cartilage. The same condition was noted in chicks fed diets deficient in leucine and phenylalanine.

Beef blood is deficient primarily in isoleucine. Various experiments revealed that the tongue deformity was not the result of inanition or weight loss, though these occurred, but specifically of the amino acids isoleucine, leucine, or phenylalanine.

It is of interest that these particular protein components are required for normal development of a bit of cartilage in the mouth. One wonders whether any other tongue deformity may be associated with blood deficiency, and one hopes that many other congenital malformations will disappear with improvements in human nutrition.

1. Grau, C. R.: Deformity of the Tongue Associated with Amino Acid Deficiencies in the Chick. Proc. Soc. Exper. Biol. and Med., **59**:177 (June) 1945.

TWENTY-FIVE YEARS AGO

From Journals of 1920

Acute Epididymitis.[1]—The surgical treatment of acute epididymitis is the accepted procedure * * * unfortunately not in universal use. The reason can possibly be found in the attitude of the patient to hospital treatment and the effort of the surgeon to complicate the procedure * * * The urologist understands full well the dislike of the venereal patient to hospital publicity * * * The use of the cautery obviates these difficulties * * * The cautery at white heat is gently passed through the scrotum into the globus minor, where it is permitted to remain for from 60 to 80 seconds * * * The patient is permitted to get up from the table and go home immediately. Without exception they have experienced an immediate feeling of relief * * * The reaction from the burn has been of short duration * * * The wound has healed in from two to four weeks * * * The treatment is essentially an office procedure. *Discussion.—Dr. E. G. Ballenger.*—It might seem that the cautery would seal the passage and not provide drainage. *Dr. C. W. Barron.*—* * * An old procedure is the injection of the globus major and minor * * * with novocain, then taking a bistoury and incising it * * * The use of heat * * * probably kills the gonoccocci.

From House of Infection to Hospital for Control of Venereal Disease.[2]—In Birmingham a Detention Hospital for women with venereal disease in the communicable

1. Vinson, J. C.: The Cautery in Acute Epididymitis. Sou. Med. Jour., **13**:514 (July) 1920.

2. Editorial: From House of Infection to Hospital for Control of Venereal Disease. Sou. Med. Jour., **13**:689, 1920.

stages is being opened, whose site has a history of more than passing interest. In the old days when there was a so-called segregated district, the "Red Light" * * * one of the handsomest * * * buildings was a three-story brick, white marble-front edifice, which with the lot, cost around sixty thousand dollars * * * some twelve years ago, at a time when construction represented only a fraction of its present price * * * Though the place was characterized by gaudy luxury, it had one strange deficiency. * * * in the entire house there were but three bath tubs and not a single lavatory save the one in the "Madam's" apartments and another downstairs * * * The owner and former manager of this * * * house has now offered the use of it free of charge to the county for the prevention of the spread of the very diseases which heretofore were cultured there * * * Known or suspected prostitutes are to be arrested on the charge of vagrancy, examined for active venereal diseases, and kept there till they are in a non-infectious stage * * * Due to the impetus furnished by war time measures for control of venereal diseases, a movement for eradication has swept the country.

Louisville Meeting.[1]—Pray consider it no reflection on your erudition that we should sketch a brief resume of our city by the falls that waits with eagerness to welcome you to the meeting of the Southern Medical Association, November 15-18 * * * One hundred and twenty-two years ago Colonel George Rogers Clark and his band of French explorers were coming down the Ohio River when they saw a tremendous reef * * * And here on Corn Island they landed and pitched their tents to form the nucleus of the now splendid city of Louisville.

1. Special Article. The Gateway to the South. Sou. Med. Jour., **13**:691, 1920.

Book Reviews

Poet Physicians: An Anthology of Medical Poetry Written by Physicians. Compiled by Mary Lou McDonough. 210 pages. Springfield, Illinois: Charles C. Thomas, Publisher, 1945. Cloth, $5.00.

This excellent anthology was read with much enjoyment. It is amazing how many of the world's best known physicians also wrote excellent poetry, such as Redi, Darwin, Jenner, Mitchell (father and son), Holmes, Wyeth, Ronald Ross, Sherrington, Solis-Cohen, Henry Head, Da Costa, Garrison, Tucker, Thayer, Blount, J. B. MacCallum, Faye, Robinson, Oliver and many others. The number of bacteriologists, pathologists, anatomists and neurosurgeons who lean to medical poetry seems out of proportion to their numbers in the profession.

It is of interest to note that well known poets such as Campion, Cowley, Smollett, Goldsmith, Crabbe, Schiller, Keats, Channing, Arthur Conan Doyle, Gogarty, McCrae, Satio, and F. B. Young were also physicians.

Physicians of all nationalities from Wang Wei, A.D. 699 to John W. Thompson, A.D. 1906, are listed. There is hardly a poem which is not acceptable. Many Southerners include E. A. Blount, Texas; T. H. Chivers and F. O. Ticknor, Georgia; J. A. Wyeth, Alabama; W. B. Magruder, Maryland; J. K. Mitchell, H. L. Smith and B. R. Tucker of Virginia; Merrill Moore, Tennessee. The SOUTHERN MEDICAL JOURNAL would like to have seen Dr. George Colmer, the discoverer of epidemic poliomyelitis, listed as a poet on page 206.

It is a pity that the content of Fracastoro's "Syphilis" could not be in poetic form. The inclusion of a non-medical poem such as McCrae's "In Flanders Fields" and the omission of fragments from Goldsmith's "The Deserted Village" are hardly consistent. Especially amusing is a poem entitled "The Consultation."

The Specificity of Serological Reactions. By Karl Landsteiner, M.D., The Rockefeller Institute for Medical Research, New York. With a Chapter on Molecular Structure and Intermolecular Forces by Linus Pauling. Revised edition. 310 pages. Cambridge, Massachusetts: Harvard University Press, 1945. Cloth $5.00.

Any book written by Karl Landsteiner is a collector's item worth the cost. Dr. Landsteiner was perhaps among the five or ten leading contributors to the field of laboratory medicine during the past fifty years. Besides discovering the blood groups which make transfusions possible and being first to discover the virus of poliomyelitis, just before his death Dr. Landsteiner proved the existance of the Rh factor. These are contributions hardly equalled in this country or abroad. Most of Dr. Landsteiner's research life was spent in working out the details of immuno-chemistry and this volume is a review of the entire field by the man best informed on the subject. There is a scholarly appraisal of the facts from several thousand publications. Dr. Merrill Chase and Dr. Alexander Wiener deserve thanks for completing the publication which Dr. Landsteiner had revised shortly before his death. Included is a chapter on molecular structure by Dr. Linus Pauling. This monograph is one not likely to lose its value with time.

Bacteriology for Medical Students and Practitioners. By A. D. Gardner, M.D., F.R.C.S., Oxford Professor in Bacteriology, University of Oxford. Third edition. 264 pages, illustrated. New York: Oxford University Press, 1944. Cloth $2.50.

This text book on bacteriology is brief, fairly complete and concise. It includes not only bacteriology, but contains information on virus, fungous and protozoan diseases, bacteriophage and immunology. Omitted are all references, details on the preparation of special media, details of virus and other technics. It is a good outline for medical students and physicians who do not specialize in laboratory medicine, but, of course, will be unsatisfactory to the bibliographer or laboratory worker. It is a comprehensive outline.

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Southern Medical News

ALABAMA

Dr. Sydney E. Langer, U. S. Public Health Service, has been appointed Health Officer of Calhoun County, succeeding the late Dr. Artice E. Culberson, Anniston. Dr. Culberson died while serving as Acting Health Officer of the County following resignation of Dr. Julius E. Dunn, Anniston, as Health Officer of Calhoun and Etowah Counties to enter private practice in Wetumpka.

Dr. Charles J. Fisher, Montgomery, Health Officer of Tuscaloosa County, has been named Health Officer of Lauderdale County.

Dr. Elmus K. Hanby, Attalla, is Acting Health Officer of Etowah County.

Dr. Albert F. Tatum, Tuscaloosa, and Miss Mary Nell Routledge, Birmingham, were married recently.

Dr. Henry Randall Thomas, Montgomery, and Miss Patricia Jane Piper, Rochester, Minnesota, were married recently.

ARKANSAS

Dr. D. A. Rhinehart, Little Rock, has been elected President, American Registry of X-Ray Technicians.

Arkansas State Medical Board at a recent meeting elected Dr. Robert J. Haley, Jr., Paragould, President; Dr. Robert H. Hood, Russellville, Vice-President; and Dr. Leonce J. Kosminsky, Texarkana, Secretary-Treasurer.

Dr. C. W. Rasco, Jr., has been released from military service and has returned to practice at DeWitt.

Dr. G. C. DeBolt, Rogers, has been elected Surgeon of the local American Legion Post.

Dr. A. B. Dickey, State Sanatorium, has been elected President, Booneville Rotary Club.

Dr. Martin M. Even, Fort Smith, has accepted a residency at the Milwaukee County Hospital, Milwaukee, Wisconsin.

Dr. E. J. Easley, Little Rock, has been elected Secretary, Pulaski County Medical Society.

Dr. Merle Crow, Warren, Captain, Medical Corps, U. S. Army, has been awarded the Purple Heart for wounds sustained in action in the Philippines.

DEATHS

Dr. James Claude Cunningham, Little Rock, aged 63, died recently.

Dr. Lee O. Greene, Pea Ridge, aged 65, died July 4.

Dr. Amos Elmer Robinson, Leachville, aged 54, died July 5.

Dr. H. D. Robinson, Manila, aged 49, died recently.

Dr. William Wesley Ward, Alexander, aged 72, died recently.

DISTRICT OF COLUMBIA

Dr. Wallace H. Graham, Lieutenant-Colenel, Medical Corps, U. S. Army, Kansas City, Missouri, has been named by President Truman to be his personal physician.

Georgetown Clinical Society, Washington, has elected Dr. Raymond C. Kirchner, President; Dr. Walter K. Angevine, Vice-President; and Dr. Robert F. Costello, Secretary-Treasurer.

Jacobi Medical Society, Washington, has elected Dr. Lester Neuman, President; Dr. Benjamin Golden, Vice-President; Dr. Leon Gerber, Secretary; and Dr. Edward A. Cafritz, Treasurer.

Dr. Henry H. Hazen, Washington, was recently reelected to serve another term as President of the District Social Hygiene Society; and Dr. George W. Creswell, Washington, was re-elected Treasurer.

Dr. Alvin R. Sweeney, U. S. Public Health Service, formerly head of the Marine Hospital, Cleveland, Ohio, and Medical Officer for the Ninth Naval District, is Superintendent of Gallinger Municipal Hospital.

Dr. Brian B. Blades, Lieutenant-Colonel, Medical Corps, A. U. S., Chief of Thoracic Surgical Section, Walter Reed General Hospital, Washington, formerly of St. Louis, Missouri, has been appointed Consultant to the Surgeon General in Thoracic Surgery, in addition to his other duties.

DEATHS

Dr. Guy Arnold, Washington, aged 68, died recently of gastric hemorrhage and cerebral thrombosis.

Dr. Joel Adams Tilton, Jr., Washington, aged 50, died recently of coronary occlusion.

Dr. Joseph Meredith Toner, aged 80, died July 30.

Continued on page 60

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Pediatrics	December 10-14, 1945
Tropical Medicine and Parasitology	December 10-21, 1945
Tropical Medicine and Parasitology	January 2 to May 25,1946
Obstetrics and Gynecology	January 14-18, 1946

For detailed information write

DIRECTOR

Department of Graduate Medicine
1430 Tulane Ave. New Orleans 18, La.

Continued from page 58

FLORIDA

State Board of Medical Examiners has elected Dr. J. B. Kollar, Vero Beach, President; Dr. Frank D. Gray, Orlando, Vice-President; and Dr. H. D. Van Schaick, Secretary-Treasurer, reelected.

Dr. Webster Merritt, Jacksonville, was recently elected a Director from the second district of the Florida Historical Society.

Dr. C. A. Rudisill, Tampa, who was released from military duty March 15, has resumed practice with offices at 301 Lafayette Arcade.

Dr. T. H. Wallis, Ocala, who has been inactive for several years, has resumed his practice.

Dr. Edward Meadow, Miami, has been doing postgraduate work at Cook County Postgraduate School of Medicine, Chicago, and will study for three months at the New York Polyclinic, New York City.

Dr. Jack Denis Flynn and Miss Stella Rosalie Valenti, both of Tampa, were married recently.

Dr. Benjamin Jackson Philips, Jr., Jacksonville, and Miss Carolyn Parker, Lenoir, North Carolina, were married recently.

Dr. William Merrill Corry Wilhoit, Quincy, and Miss Martha Elizabeth Watkins, Valdese, North Carolina, were married recently.

DEATHS

Dr. Andrew B. A'britton, Wildwood, aged 63, died recently.

GEORGIA

Third District Medical Society has elected Dr. Willis P. Jordan, Sr., Columbus, President; Dr. Herschel A. Smith, Americus, Vice-President; and Dr. Walter Gus Elliott, Cuthbert, Secretary-Treasurer.

Dr. John H. Walker, Atlanta, has been appointed Pediatric Consultant to the Division of Maternal and Child Health, Georgia Department of Public Health, succeeding Dr. Paul R. Ensign, who is now Director of Maternal and Child Health, Division of the Kansas State Board of Health, Topeka, Kansas.

Dr. Rufus F. Payne, Atlanta, Assistant Health Officer of

Continued on page 62

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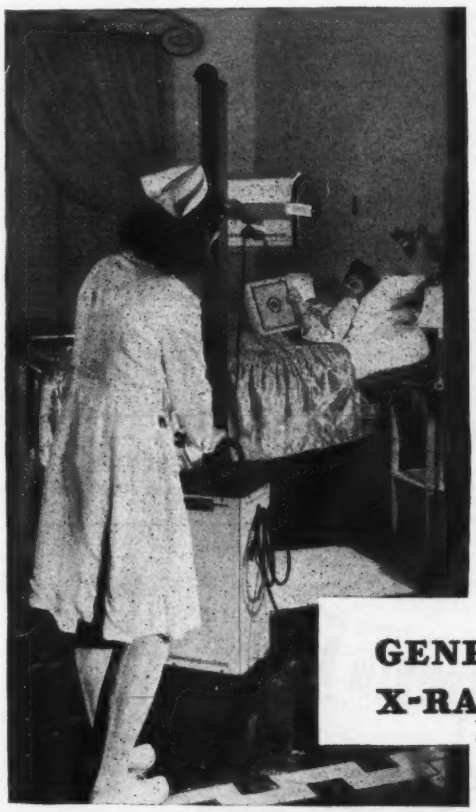

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Continued from page 60

Fulton County, has been appointed Medical Superintendent, State Tuberculosis Sanatorium, Alto.

Dr. John M. Walton, Atlanta, has been named Associate Medical Director, Southeastern area of the American Red Cross.

Dr. Glenn E. Seymour, Albany, is now associated with Coleman Sanatorium, Eastman.

Dr. Mayes Gober, retired Marietta surgeon, has moved to his farm at Noontootla Creek in Fannin County.

Dr. F. M. Mullino, Montezuma, recently celebrated his fifty-second anniversary as a practicing physician.

Deaths

Dr. George Ollie Allen, Marietta, aged 73, died recently.
Dr. John F. Burkhalter, Claxton, aged 59, died recently.
Dr. William T. Hinton, Dacula, aged 76, died recently.
Dr. Walter Wesley Sessions, Sr., aged 70, died recently.
Dr. William H. Swain, Martin, aged 76, died recently.
Dr. Robert Glenn Stone, Atlanta, aged 64, died recently of cardiac decompensation and renal insufficiency.

KENTUCKY

An $84,000 contract has been signed by the Governor to draft plans for construction of five tuberculosis hospitals of about a hundred beds each; a hospital in Madisonville, first district; Paris, third; Ashland, fourth; London, fifth; and Glasgow sixth.

Professional Advisory Committee for the program of Vocational Rehabilitation set up in the Division of Special Education, is composed of Dr. P. E. Blackerby, Louisville; Dr. A. M. Lyon, Frankfort; Dr. W. M. Brown, Lexington; Dr. Hugh R. Leavell, Louisville; Dr. Robert Sory, Richmond; Dr. C. C. Howard, Glasgow; Dr. Leon Higdon, Paducah; Dr. K. N. Salyer, Hazard; and Dr. Carl Johnson, Louisville.

Dr. John O. Salyers, Hazard, has been appointed full-time physician, State Reformatory, LaGrange, succeeding Dr. H. B. Blaydes, LaGrange.

Dr. Cripps B. Shacklet, Shively, Commander, stationed at the Atlantic Fleet Naval Training Center, Miami, Florida, has received the Legion of Merit Medal.

Dr. Bertha A. C. Wiseman, LaGrange, Health Director, Oldham County, has been assigned temporarily to the Shelby County Department of Health until a full time director can be named to succeed Dr. Martin H. Skaggs, resigned.

Dr. James C. Spalding, Lebanon, and Miss Arminta Scott, Corinth, Mississippi, were married recently.

Dr. Beverly C. Chatham, Greenville, and Miss Janet Johnson, Nashville, were married recently.

Deaths

Dr. J. Paul Keith, Louisville, aged 67, died July 1.

Dr. William Ford Richardson, Beech Creek, aged 74, died recently of heart disease.

Dr. Vernon Blythe, Paducah, aged 68, died recently of lobar pneumonia.

Dr. Edward Lee McIntyre, Springfield, aged 81, died recently of bronchopneumonia.

Dr. William T. McKinney, Anchorage, aged 77, died recently.

LOUISIANA

Second District Medical Society has elected Dr. J. W. Atkinson, Gretna, President; and Dr. Robert A. Katz, New Orleans, Secretary-Treasurer.

Dr. W. H. Block, New Orleans, is completing his fiftieth year in the practice of medicine.

Dr. John C. Henthorne, Jackson, Mississippi, has been appointed Assistant Professor of Pathology, Tulane University School of Medicine, New Orleans.

Dr. Alton Ochsner, New Orleans, has been given the title of member honoris causa of the College of Physicians and Surgeons of Costa Rica.

Dr. Wilbur C. Smith, Professor of Gross Anatomy, Tulane University School of Medicine, New Orleans, has been elected President, National Collegiate Athletic Association.

Continued on page 64

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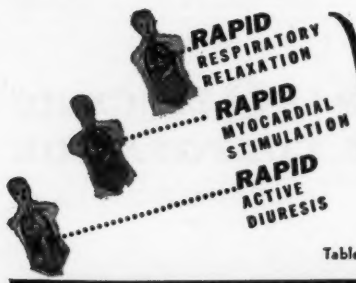

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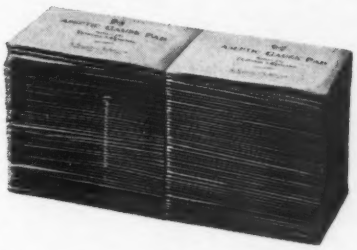

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Continued from page 62

Dr. Roscoe LeRoy Pullen, Instructor in Medicine, Tulane University School of Medicine faculty, New Orleans, has been chosen by Knox College, Galesburg, Illinois, as recipient of the award for the alumnus who has done most for humanity during the year.

Dr. Urban Maes' portrait was recently presented by the graduating class to the Louisiana State University School of Medicine, New Orleans, of which he is Professor of Surgery and Director of the Department.

Dr. Jerome J. Romagosa and Miss Ethyl Mae Litton, both of Opelousas, were married recently.

Dr. James Ray Nunez, Abbeville, and Miss Agnes Pietrowski, Jersey City, New Jersey, were married recently.

MARYLAND

Dr. William R. Cameron, Baltimore, formerly Health Officer of Hagerstown and Washington County, has been chosen Assistant Director of Welfare for Medical Care.

Deaths

Dr. Arcturus Lee Howard, Chevy Chase, aged 75, died recently of uremia, cerebral hemorrhage and cardiovascular-renal disease.

Dr. William Dodds Scott, Jr., Baltimore, aged 66, died recently of congestive heart disease and hypertensive cardiovascular disease.

MISSISSIPPI

Dr. Thomas K. Chandler, Jr., Tunica, Director, Tunica County Health Department, has been appointed to a similar position in Coahoma County, succeeding Dr. Guy R. Post, who has become Medical Director of the Crippled Children's Service and Medical Consultant of Vocational Rehabilitation for the State.

Dr. James P. Sharon, Columbia, has resigned as Acting Director, Marion County Health Department.

Dr. Rush E. Netterville, Wilkinson, and First Lieutenant Frances Foil McAllister, Mount Pleasant, North Carolina, were married in Epinal, France, April 12.

Dr. John C. Henthorne, Jackson, has been appointed Assistant Professor of Pathology, Tulane University School of Medicine, New Orleans, Louisiana.

Deaths

Dr. Charles Morgan Davis, Laurel, aged 76, died recently.

Dr. Walter Frank Coleman, Hickory Flat, aged 60, died recently.

Dr. Samuel H. Howard, Durant, aged 81, died recently.

Dr. Charles W. Patterson, Crowder, aged 73, died recently.

Dr. Ross Adams Switzer, McHenry, aged 69, died recently.

Dr. Harvey John Flowers, Kilmichael, aged 73, died recently.

MISSOURI

Dr. Wallace H. Graham, Lieutenant-Colonel, Medical Corps, U. S. Army, Kansas City, has been named by President Truman to be his personal physician.

State Board of Health will have the following members for a four-year term these appointed by the Governor: Dr. George E. Knappenberger, Kansas City; Dr. Frank H. Rose, Albany; Dr. Ralph A. Kinsella, St. Louis; and other members of the Board recently appointed are Dr. Robert M. James, Joplin; Dr. Charles H. Neilson, St. Louis; Dr. Howard B. Goodrich, Hannibal; and Dr. Hardin M. Henrickson, Poplar Bluff.

State Cancer Commission, recently appointed by the Governor, include Dr. Major G. Seelig, St. Louis; Dr. Clifton Smith, St. Joseph; Dr. W. Ed. Jameson, Fulton; and Dr. Frank T. Hodgdon, Hannibal.

Dr. Frank C. Neff, Kansas City, retired recently as Professor and Head of the Department of Pediatrics, University of Kansas School of Medicine, Kansas City, Kansas, and has been succeeded by Dr. Herbert C. Miller, Jr., New Haven, Connecticut. Dr. Neff has been associated with the School since 1924.

Dr. Edward J. Curran, Kansas City, has retired as Professor of Ophthalmology and Head of the Department, University of Kansas School of Medicine, Kansas City, Kansas, and is succeeded by Dr. John A. Billingsley, Kansas City, Kansas.

Kansas City Obstetrical and Gynecological Society has elected Dr. Richard G. Helman, Kansas City, President; Dr. Russell D. Etzenhouser, Vice-President; and Dr. John O. Kennedy, Secretary-Treasurer.

Dr. E. K. Langford, Platte City, has been appointed County Physician for Platte County and Health Officer of Platte City.

Continued on page 66

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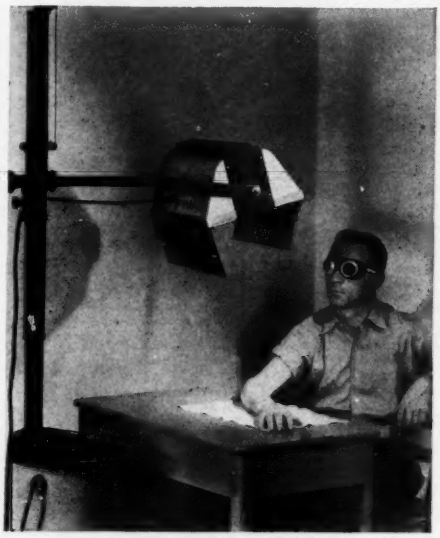

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provides full hot mercury quartz spectrum—is quick starting, entirely self-contained, designed and counter-balanced for maximum facility of manipulation. Less than one minute at the 30-inch distance is usually ample exposure.

Information as to dosage and technic in treating the conditions mentioned sent on request.

The BURDICK CORPORATION
MILTON WISCONSIN

Continued from page 64

Dr. R. M. James, Joplin, began his duties as State Health Commissioner on July 1.

Dr. Brian B. Blades, St. Louis, Lieutenant-Colonel, Medical Corps, A. U. S., Chief of the Thoracic Surgical Section of Walter Reed General Hospital, Washington, D. C., has been appointed Consultant to The Surgeon General in thoracic surgery, in addition to his other duties.

Dr. Howard A. Rusk, St. Louis, Colonel, Medical Corps, A. U. S., Director of the Convalescent Rehabilitation Division of the Army Air Forces, flew from Washington to Potsdam, Germany, to confer with President Truman and General Omar N. Bradley on the reorganization of the Veterans' Administration.

Dr. Lee D. Cady, St. Louis, Colonel, Commanding Officer of the Twenty-First General Hospital in France, was recently decorated with the Croix de Guerre by the French Government "for exceptional services during the liberation of France."

Dr. William E. Angell, Rocheport, recently celebrated his fiftieth anniversary in the practice of medicine.

Dr. M. L. Diekroeger, Boonville, was recently appointed County Physician of Cooper County.

Dr. Harold Frederick Bertram, Memphis, and Miss Margaret Baden Patterson, Baltimore, Maryland, were married recently.

Dr. Hugh McCulloch, Jr., St. Louis, and Miss Patricia Rentsler, Plainfield, New Jersey, were married recently.

Deaths

Dr. John Andrews, Grant City, aged 70, died recently of hypertensive and arteriosclerotic heart disease.

Dr. Charles Roscoe Buren, Princeton, aged 71, died recently of coronary occlusion.

Dr. Frank Alvin Elders, De Soto, aged 56, died recently of coronary disease.

Dr. Edward L. Heiple, St. Louis, aged 56, died recently.

Dr. Dean Stelle Rising, Kansas City, aged 62, died recently.

Dr. Sherwin E. Mella, Kansas City, aged 50, died recently.

Dr. John William Patton, Cabool, aged 84, died recently of ascites and cerebral hemorrhage.

Dr. William H. Vogt, St. Louis, aged 68, died recently.

NORTH CAROLINA

Dr. G. F. Reeves, Winston-Salem, former Secretary, Forsyth County Medical Society, has gone into private practice in Florence, South Carolina. Dr. Fred G. Pegg, Winston-Salem, succeeds Dr. Reeves as Secretary of Forsyth County Medical Society.

Dr. Louis G. Beall, who was recently named Acting Superintendent, State Hospital, Morganton, succeeding Dr. John R. Saunders, has resigned.

Dr. James A. Whitaker, Health Officer of Rocky Mount, has resigned to join the staff of the Columbia Presbyterian Hospital, New York.

Dr. Stephen McIntyre, Lumberton, has been appointed Chief Surgeon of the Baker Sanatorium, succeeding Dr. Felda Hightower, who resigned to return to his former position with the Bowman Gray School of Medicine, Winston-Salem.

Dr. Russell L. Holman, Department of Pathology, University of North Carolina School of Medicine, Chapel Hill, has been awarded a grant by the John and Mary R. Markle Foundation to continue studies on the relationship of diet and renal insufficiency to arterial disease.

Continued on page 68

Classified Advertisements

ESTABLISHED HOSPITAL FOR LEASE — A Sanitarium for nervous, mental, alcoholic and drug cases doing an excellent business available for lease to a reputable physician or medical group. Dr. E. W. Stokes, 923 Cherokee Road, Louisville 4, Ky.

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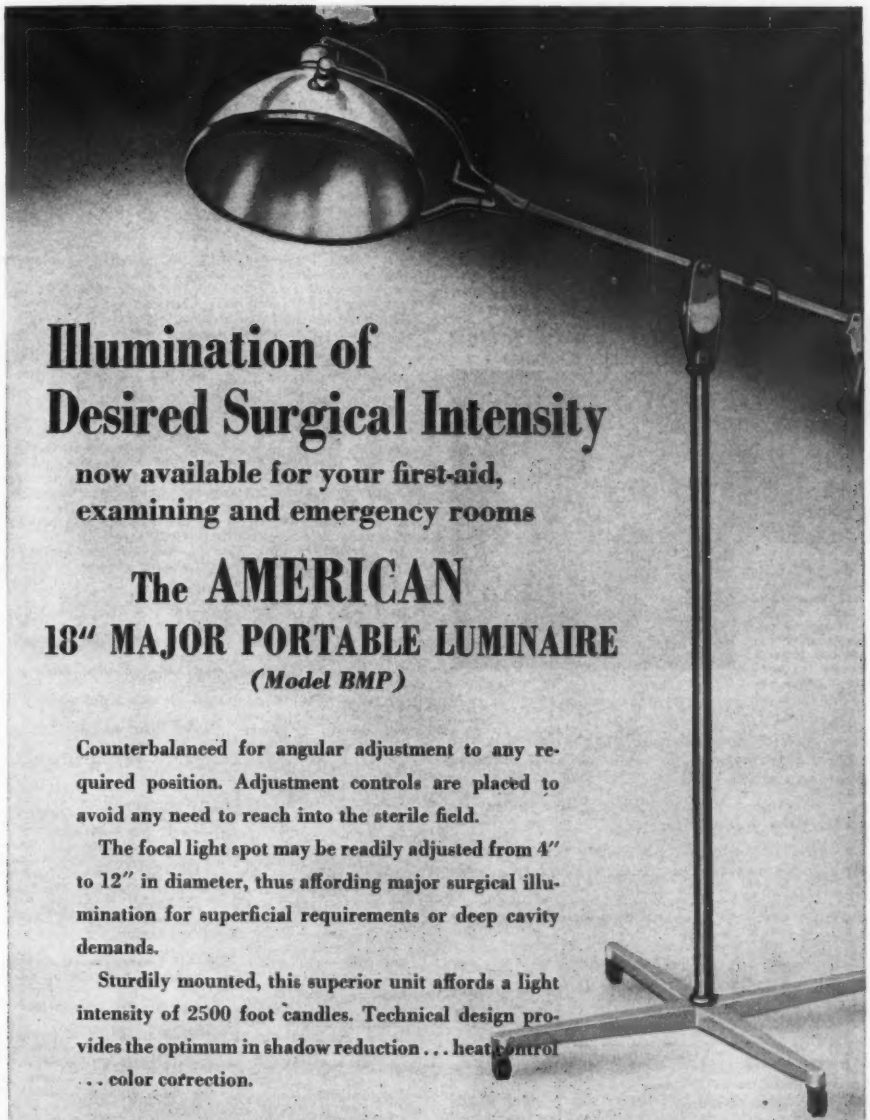
WANTED by woman executive, position as lay superintendent or business manager of Southern hospital, fifty beds or under. Experienced. Write SME, care Southern Medical Journal.



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(Model BMP)

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The focal light spot may be readily adjusted from 4" to 12" in diameter, thus affording major surgical illumination for superficial requirements or deep cavity demands.

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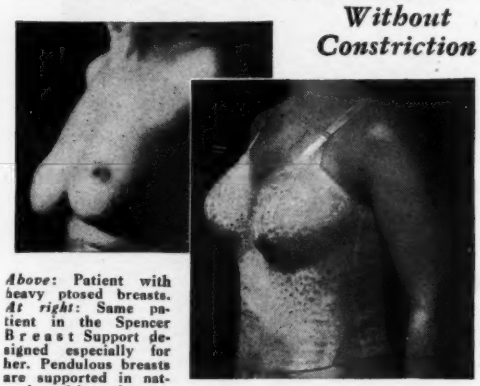
Spencer Supports Hold Breasts in Natural Position Without Constriction



Above: Patient with heavy ptosed breasts. *At right*: Same patient in the Spencer Breast Support designed especially for her. Pendulous breasts are supported in natural position, thus relieving abnormal strain.

Improve circulation through the breasts, lessening the chance of the formation of non-malignant nodules and improving tone.

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Help nursing mothers by guarding against caking and abscessing.

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SPENCER *INDIVIDUALLY DESIGNED* **SUPPORTS**
Reg. U.S. Pat. Off.
For Abdomen, Back and Breasts

Continued from page 66

Dr. J. F. Owen, formerly Superintendent, State Hospital, Raleigh, has opened offices in the Professional Building, Raleigh, for the practice of medicine.

Dr. F. L. Byerly, Winston-Salem, has left the Forsyth County Sanatorium to go to Fort Wayne, Indiana.

Dr. Tom A. Williams, Director, Asheville City Guidance Clinic, has returned to Asheville after convalescing in Florida.

Dr. Ross Simonton McElwee, Jr., Statesville, and Miss Doris Edgar, Kingston, New York, were married recently.

Dr. Herbert Winston Frostick and Miss Jean Caroline Wall, both of Charlotte, were married recently.

Dr. John Harvey Nicholson, Statesville, and Miss Gertrude James May, Richmond, Virginia, were married recently.

Deaths

Dr. Foster Flavorial Burnett, Wilmington, aged 54, died recently of pulmonary embolism.

Dr. Trumbull Frazer, Asheville, Captain, Medical Corps, U. S. Army, aged 29, was killed in action in Germany February 7.

Dr. Raymond Robinson Simmons, Winston-Salem, aged 53, died recently of aortic and myocardial insufficiency.

Dr. G. E. Stone, King, aged 54, died recently.

Dr. Thomas G. Taylor, Leaksville, aged 88, died recently of cerebral hemorrhage.

OKLAHOMA

New member physicians of the State Board of Health are Dr. Charles R. Rountree, Oklahoma City, Chairman, nine-year term; Dr. Charles Edgar White, Muskogee, Secretary; Dr. Tracey H. McCarley, McAlester, three-year term; Dr. Catherine F. T. Brydia, Ada, one-year term; Dr. Victor C. Tisdal, Elk City, eight-year term. Dr. Grady F. Mathews was unanimously elected to continue as State Health Commissioner.

Dr. W. A. Howard, Chelsea, has been discharged from the Armed Forces and will resume private practice at Chelsea.

Deaths

Dr. George H. Ellis, Oilton, aged 73, died recently of cardiac failure and carcinoma of the leg.

Dr. Austin Hutchison, Bixby, aged 70, died recently of coronary occlusion.

Dr. Jesse B. Lampton, Sapulpa, aged 66, died recently of coronary heart disease.

Dr. U. G. Hall, Copan, aged 61, was killed recently when his car was struck by a train.

Dr. Edward S. Weaver, Cordell, aged 64, died recently.

Dr. R. C. Bills, Soper, aged 81, died recently.

Dr. D. E. Little, Eufaula, aged 67, died recently.

SOUTH CAROLINA

Dr. Joseph I. Waring, Charleston, has been appointed a member of the State Board of Health, succeeding Dr. Kenneth M. Lynch, Charleston, who has served for ten years as a member.

Dr. Joseph Sumter Rhame, who has been associated with the Medical College of the State of South Carolina, Charleston, since 1910, has resigned as Clinical Professor of Surgery.

Dr. Furman Townsend Wallace announces the opening of an office at 714 Andrews Building, Spartanburg, for the practice of general surgery.

Dr. Hugh Smith, Greenville, Lieutenant-Colonel, Medical Corps, U. S. Army, retired because of medical disability, has resumed practice.

Dr. W. B. McLawhorn, Greenville, has been named Resident Physician, Columbia Hospital.

Dr. J. H. Turkel, a recent resident at the Metropolitan Hospital, New York City, is Orthopedic Resident at Shriners' Hospital, Greenville, where he will assist Dr. J. Warren White as well as on the orthopedic service at Greenville General Hospital.

Moore Clinic, Columbia, has been granted a charter to own and operate a hospital and medical clinic. Dr. Austin T. Moore is President and Treasurer; and Dr. R. L. Dougherty is Secretary.

Dr. William L. Cheezem, Jr., Andress, and Miss Louise McBrayer, Columbia, were married recently.

Dr. Henry Donato, Mount Pleasant, and Miss Anne Theodore Koster, Charleston, were married recently.

Dr. William Boykin Lyles, Jr., Spartanburg, and Miss Barbara S. Spencer, Dursley, Gloucestershire, England, were married recently.

Dr. Ramsay Garrison Latimer, West Columbia, and Miss Jean Neuman Mehrtens, Charleston, were married recently.

Dr. Julian Muldrow DuRant, Alcolu, and Miss Marie Elizabeth Beckett, Beaufort, were married recently.

Deaths

Dr. C. T. J. Giles, Greenville, aged 76, died in July.

Continued on page 70

For the Failing Heart

Phyllicin

A "theophylline" for oral administration in cardiac diseases - quick acting and well tolerated. Phyllicin is a potent diuretic and myocardial stimulant, useful for the relief of cardiac distress and pain, to diminish dyspnoea and to reduce edema.

DOSE: 1 or 2 tablets (4 grains each) after meals.

Phyllicin, theophylline-calcium salicylate, Trade Mark Bilhuber.

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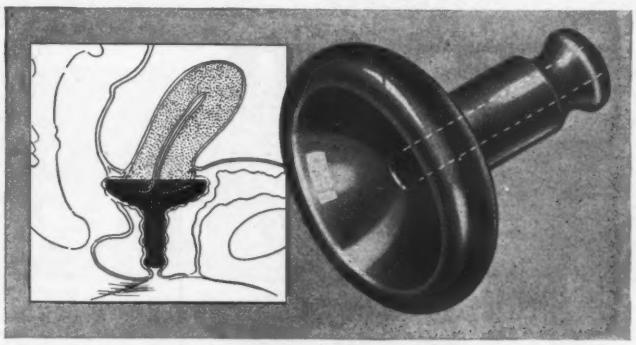
An Improved Device for Treatment of Inoperable Uterine Prolapse



The Emmert-Gellhorn Pessary with new drainage features

In this modification by Dr. Frederick V. Emmert, the original Gellhorn pessary for relief of inoperable prolapse has been improved with great success. The new pessary is made of one piece of Neicomold, a boilable synthetic material, unbreakable, smooth and unaffected by the genital secretions. Neither does it irritate or affect the vaginal mucosa. Instead of a solid stem, the Emmert-Gellhorn pessary employs a stem drilled throughout its length. This offers the advantage of drainage, preventing accumulation of secretions. Fewer removals of the pessary for cleaning are thus needed; a great benefit to aged patients. For greater comfort, the stem is ¼ inch shorter than that of the former pattern, and has no knob. The stem, however, is hollowed to permit easy grasp for removal.

8E5162A—Emmert-Gellhorn Pessary, diameter 2 or 2½ inches, state size, each.....**$2.25**

8E5162B—Special Sizes—2¼, 2¾ or 3 in., each.**$2.75**

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Continued from page 68

Dr. Beverly A. Henry, Anderson, aged 82, died recently of coronary thrombosis.

Dr. J. E. Massey, Rock Hill, aged 70, died July 14.

TENNESSEE

Upper Cumberland Medical Society at its recent meeting elected Dr. T. M. Crain, Monterey, President; Dr. A. B. Qualls, Livingston, First Vice-President; Dr. Myrtle L. Smith, Livingston, Second Vice-President; Dr. R. E. Key, Carthage, Third Vice-President; and Dr. L. M. Freeman, Granville, Secretary.

Dr. W. W. Frye, recently appointed Professor of Preventive Medicine, Vanderbilt University School of Medicine, Nashville, has been granted six months' leave of absence to serve on a cholera commission in China.

Dr. Lucius E. Burch, Nashville, retired July 1 as Professor and Chairman, Department of Obstetrics and Gynecology, Vanderbilt University School of Medicine, Nashville. Dr. Burch was Dean of the School from 1914 until he retired to become head of the Department of Obstetrics and Gynecology.

Dr. William S. Moore, Memphis, Lieutenant-Colonel, Medical Corps, U. S. Army, has been awarded the Legion of Merit.

Dr. Russell Dorris Ward and Miss Margaret Virginia Bowen, both of Nashville, were married recently.

Dr. George H. McSwain, Paris, and Miss Mary Jane Allred, Bowling Green, Florida, were married recently.

Dr. Philip Vincent Daugherty, Nashville, and Miss Rosemary Rita Levitt, Villa Ridge, Illinois, were married recently.

Dr. Charles August Rentrop, Jr., Germantown, and Miss Marion Henrietta Meyn, Wallkill, New York, were married recently.

Dr. Charles Samuel McCammon, Maryville, and Miss Mary A. Thornburg, Knoxville, were married recently.

DEATHS

Dr. E. T. Haskins, Newbern, aged 71, died recently.

Dr. Henry Petway Spencer, Burns, aged 67, died recently of coronary thrombosis.

Dr. Charles C. Stockard, Lawrenceburg, aged 60, died recently of pernicious anemia.

Dr. Edwin Kirby Smith, McMinnville, aged 46, died recently of heart disease.

Dr. Thomas F. Taylor, Dresden, aged 75, died recently of coronary thrombosis.

Dr. Thomas Franklin Taylor, Monteagle, aged 75, died recently of carcinoma of the liver.

TEXAS

Fort Worth Eye, Ear, Nose and Throat Society has installed Dr. R. H. Needham, President and elected Dr. C. R. Lees, President-Elect; Dr. Valin R. Woodward, Vice-President; and Dr. R. H. Gough, Secretary.

Dr. T. B. Taylor, Pleasanton, formerly of Elgin, has been practicing for sixty years.

Dr. Mary Walton, U. S. Public Health Service was recently appointed Hidalgo County Health Officer.

Dr. Lamar Byers, formerly Director, Hidalgo County Health Unit, succeeds Dr. Mary Walton as Director of Paris-Lamar County Health Unit.

Dr. Heinrich N. Neidhardt, formerly Professor of Pathology, University of Kansas School of Medicine, Kansas City, Kansas, has been appointed Assistant Professor of Pathology, University of Texas Medical Branch, Galveston.

Dr. Charles A. Dwyer, Jr., Houston, and Miss Virginia Dean, Hollywood, California, were married recently.

Dr. Ruth Isadora Allen, Dallas, and Dr. Logan Underwood Mewhinney, of Holland, formerly of New Orleans, Louisiana, were married recently.

Dr. John Trenton Tucker, Jr., Fort Worth, and Miss Dorothy Dee Hill, Dallas, were married recently.

DEATHS

Dr. Samuel Gibbs Milliken, Houston, aged 49, died recently of bilateral pulmonary tuberculosis and toxic myocarditis.

Dr. Henry Houston Ogilvie, San Antonio, aged 60, died recently.

Dr. John W. Swindell, Greenville, aged 75, died recently.

Continued on page 72

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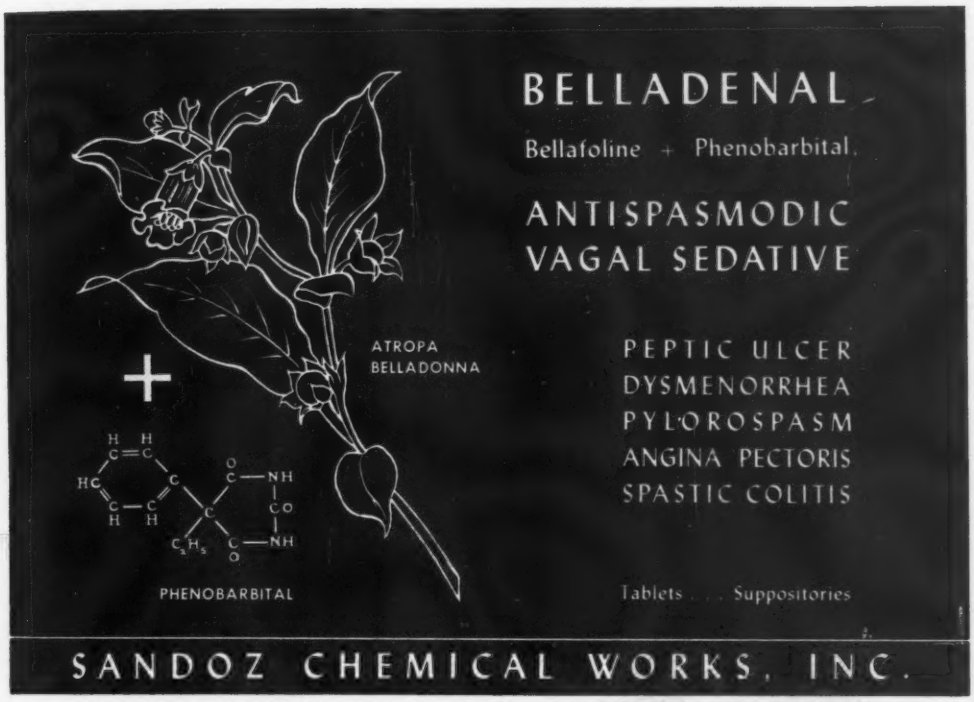
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Continued from page 70

VIRGINIA

James River Medical Society has Dr. O. L. Huffman, Arvonia, as President, he having automatically becoming President on the death of Dr. T. L. Driscoll. Dr. Garland Dyches, Dillwyn, is Secretary.

Amelia County Medical Society has elected Dr. James L. Hamner, Manboro, President and Secretary; and Dr. G. A. Arhart, Amelia, Vice-President.

Dr. Charles Preston Pope, Aiken, South Carolina, has been appointed Health Officer of Pulaski-Wythe Health District.

Dr. Brock D. Jones, Norfolk, has accepted for eighteen months a residency in gynecology and obstetrics at Philadelphia Lying-In Hospital beginning July 1.

Dr. Charles H. Henderson, Norton, has been granted the certificate of the American Board of Ophthalmology.

Dr. George S. Row, Richmond, has moved to Bridgewater for general practice.

Dr. Randolph P. Pillow, who has completed a year's internship at The Mason Clinic, Seattle, Washington, is now at University of Virginia Hospital, Charlottesville.

Dr. Milton Salasky, Norfolk, and Miss Shirley Greenberg, San Francisco, California, were married recently.

Dr. John Covington Tinsley, Jr., Lynchburg, and Miss Ellen Luberger, Wyoming, Ohio, were married recently.

Dr. Randolph Harrison Hoge, Richmond, and Miss Florence Irene Elks, Weldon, North Carolina, were married recently.

Dr. Harvey Ray St. Clair and Miss Pauline Carroll Keller, both of Staunton, were married recently.

Dr. Oscar Orton Smith and Miss Ann Christian Hunt, both of Richmond, were married July 7.

Dr. Robert Saul Salisbury, Richmond, and Miss Muriel Arline Cole, New York City, were married recently.

Dr. Lewis George Richards, Jr., Roanoke, and Miss Dorothy Nelle Quinn, Lynchburg, were married recently.

Dr. Walter Cleveland Fitzgerald, Charlottesville, and Miss Martha Ann BonDurant, Princeton, West Virginia, were married July 1.

DEATHS

Dr. Osbourne O. Ashworth, Richmond, aged 50, died July 5 of a heart attack.

Dr. Robert Edward Whitehead, Kempsville, aged 72, died July 2.

Dr. Thomas Garrett Prentlow, Chester, aged 66, died July 8.

Dr. William Read Martin, Charlotte C. H., aged 62, died recently.

Dr. John Cameron McCluer, Jr., Alexandria, aged 39, died recently.

Dr. Leroy Lee Sawyer, Great Bridge, aged 82, died recently.

Dr. Samuel Addison Reynolds, Vashti, aged 81, died July 8.

Dr. Ulpian Henry Johnson, Port Richmond, aged 63, died July 11.

WEST VIRGINIA

New Tuberculosis Committee, created by the House of Delegates of the West Virginia State Medical Association, is composed of Dr. David Salkin, Hopemont, Chairman; Dr. Eustace T. Goff, Parkersburg; Dr. John N. Reeves, Charleston; Dr. George E. Gwinn, Beckley; and Dr. Sarah Elizabeth McFetridge, Shepherdstown.

Dr. R. J. Wilkinson, Huntington, was elected Vice-President of the Alumni Association of the Medical College of Virginia at the recent annual meeting held in Richmond.

Dr. Homer O. Van Tromp, French Creek, has been named Acting Superintendent, Weston State Hospital (mental), Weston, succeeding Dr. Harry A. Garrison, resigned.

Dr. Glenn A. Carmichael, Butte, Montana, has been appointed Director, Division of Maternal and Child Hygiene of the West Virginia State Department of Health, succeeding Dr. Lenore V. L. Patrick-Chipman, who resigned some time ago to engage in practice at Williamstown, Kentucky.

Dr. Robert L. Smith, U. S. Public Health Service, Bethesda, Maryland, has been appointed Acting Director of the Bureau of Tuberculosis, succeeding Dr. James T. Duncan, resigned.

Dr. Paul H. Harmon has been named Medical Director, Morris Memorial Hospital, Milton. He formerly was Chief of Orthopedic Department of Guthrie Clinic at Robert Packer Hospital, Sayre, Pennsylvania.

Dr. L. R. Leeson, Parkersburg, has been given an honorable discharge from the Army and has returned to private practice at 1302 Market Street, Parkersburg.

DEATHS

Dr. Wallace Bernard Phillips, Gary, aged 52, died recently of acute dilatation of the heart.

Dr. Martin Frank Wright, Burlington, aged 75, died recently of cerebral hemorrhage.

MARINOL

(IMPROVED FORMULA)

MARINOL (*IMPROVED FORMULA*) is an homogenized emulsion of cod liver oil and vegetable oils fortified with fish liver oils of high vitamin A potency to which has been added pure vitamin D_3.

OUTSTANDING PROPERTIES

PALATABILITY: The desirable properties of the fish liver oils have been retained without the disagreeable taste and odor.

HOMOGENIZATION: This assures a uniform and stable product that permits of easy miscibility with milk, special formulae, fruit or vegetable juices, or with water.

HIGH VITAMIN POTENCY: 5,000 U.S.P. units of vitamin A and 500 U.S.P. units of Vitamin D_3 supply the daily minimum requirements (FDA) in one teaspoonful.

LOW COST: A single teaspoonful daily is a prophylactic dose.

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EASY ADMINISTRATION is possible because of unusual potency of small dose.

CONSUMER PRICE: Bottle of 6 fl. oz. 85 cents. Bottle of 12 fl. oz. $1.50 (M.P.R. 392). HOW SUPPLIED: Bottles of 6 fl. oz. and 12 fl. oz.

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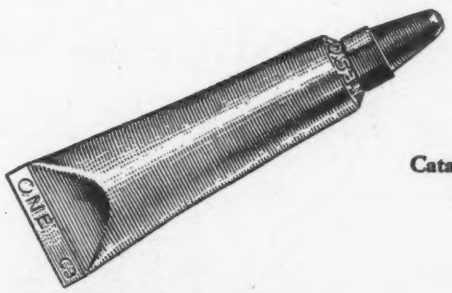

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Sanitary Control of Dextri-Maltose

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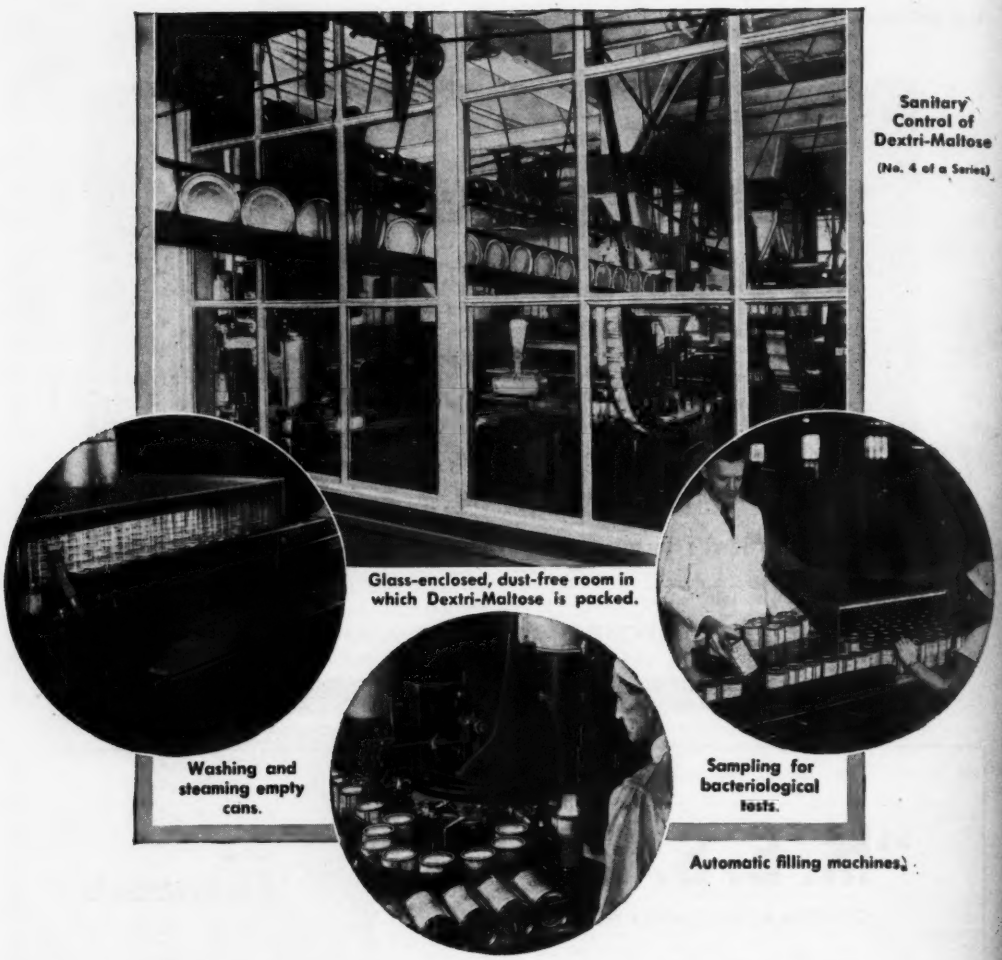

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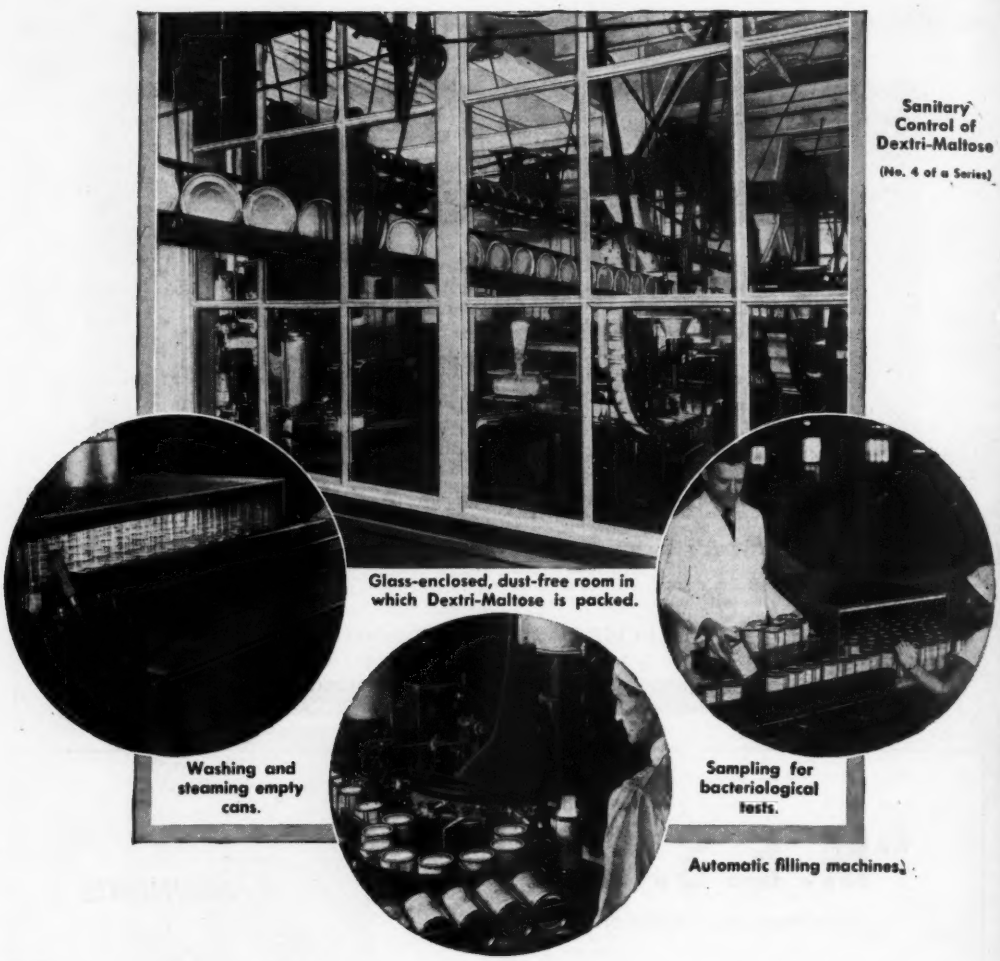

Glass-enclosed, dust-free room in which Dextri-Maltose is packed.

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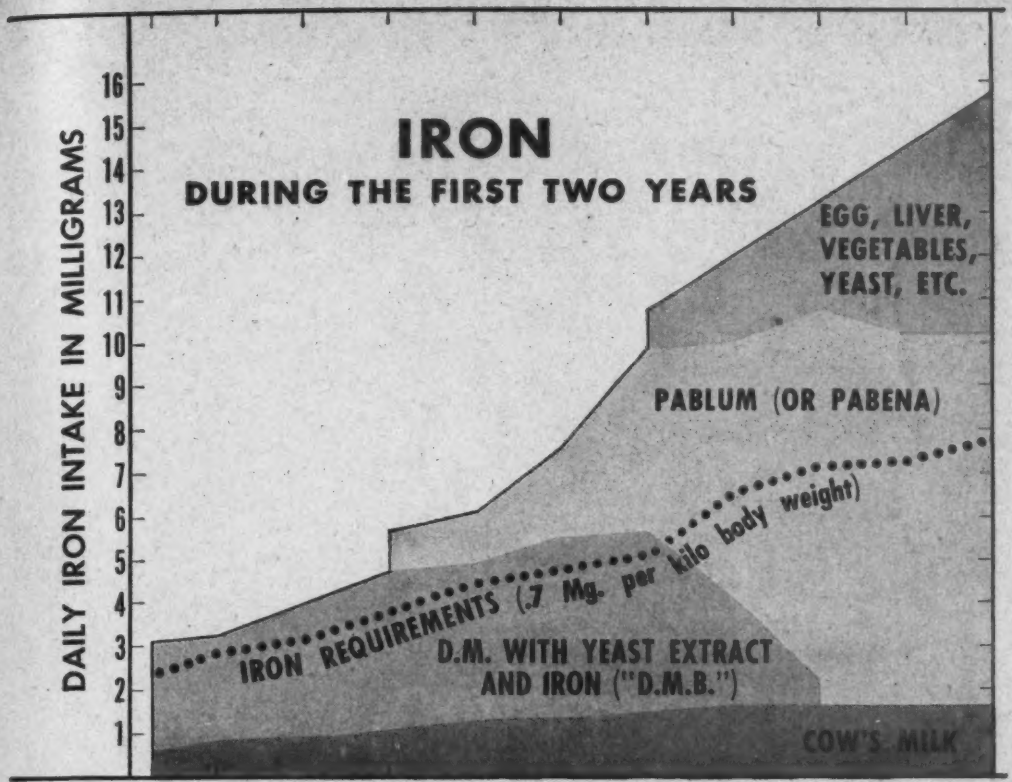
Automatic filling machines.

Extreme Cleanliness used in Packing DEXTRI-MALTOSE

THE EXACTING care used in manufacturing Dextri-Maltose is maintained, even to the final packing and wrapping. The empty cans are washed inside and outside by hot water under pressure, then steamed and dried. Cans are filled in a glass-enclosed, air-conditioned room, the atmosphere of which is washed to free it from dust and bacteria. Enclosed conveyors leading to this room send Dextri-Maltose to machines which automatically fill and close the cans without human handling of the product. The cans are again washed and inspected for imperfections. At this step specimen cans are selected for bacteriological examination to insure that there has been no break in the sanitary control. Finally the cans are wrapped to prevent the covers from accumulating dust. Dextri-Maltose is then held in storage and released for the market only after final approval from the bacteriological laboratory. At every stage in the manufacture of Dextri-Maltose our effort is concentrated on supplying the physician with the carbohydrate that will best promote and maintain the health of his patients. *"The True Measure of Economy Is Value, Not Price"* . . .

MEAD JOHNSON & COMPANY, Evansville, Indiana, U.S.A.

Please enclose professional card when requesting samples of Mead Johnson products to cooperate in preventing their reaching unauthorized persons.



AGE, Mos.	¼	1	2	3	4	5	6	9	12	18	24
WEIGHT, Lbs.	7	9	10	12	14	15	17	19	21	24	27
MILK, Oz.	10	16	18	21	24	26	28	32	32	32	32
"D.M.B.," Oz.	1	1	1¼	1½	1½	1¾	1¾	1	¼	0	0
PABLUM, Oz.	0	0	0	⅛	¼	¼	½	¾	1	1	1

IRON DURING THE FIRST TWO YEARS

During fetal life iron accumulates (in the form of hemoglobin) in the infant's body. After birth the hemoglobin frequently drops to 50% by the third month, especially in prematures. Neither breast milk nor cow's milk supplies sufficient iron for the needs of the infant. This chart shows that when the carbohydrate is "D.M.B." and the cereal is either Pablum or Pabena, a generous margin of safety over the requirements can be maintained, not only during the important first six months, but throughout the first two years of life.

More iron than the calculated requirement is needed because some iron is not utilized. In rapidly growing or poorly nourished infants, and in the presence of infection, the need for iron may be even greater than is indicated in this chart for normal infants.

MEAD JOHNSON & COMPANY, Evansville 21, Ind., U.S.A.

"Physicians should become thoroughly familiar with the use of one good powdered leaf digitalis, preferably one prepared by a pharmaceutical house that grows its own digitalis and standardizes it in its own laboratories."

Choosing a— DIGITALIS PRODUCT

After noting a marked increase in digitalis poisoning among congestive heart failure patients treated in a southern hospital in 1943 as compared to the period of 1930-1939, Herrmann and associates[1] made the above recommendation.

The choice of many physicians over a long period of years has been DIGIFORTIS KAPSEALS, supplied by Parke, Davis & Company. Each Kapseal* contains powdered, fat-free digitalis leaf *grown in Parke-Davis botanical gardens and standardized in Parke-Davis laboratories.*

Digifortis Kapseals are available in bottles of 100 and 500.

1. Herrmann, G. R.; Dechard, G. M. Jr., and McKinley, W. F.: Digitalis Poisoning, J.A.M.A. 126:760 (Nov. 18) 1944.

*The word KAPSEALS designates the hermetically sealed capsules manufactured by Parke, Davis & Company. Kapseals help protect the contents from the effects of oxidation and thereby improve stability.

PARKE, DAVIS & COMPANY

DETROIT 32, MICHIGAN